THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
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MODELING FOR SILVERWARE.

By A. F. SAUNDERS, Del.

"An art can only be learned in the workshop of those who are winning their bread by it."—SAMUEL BUTLER.

Castings are used extensively in the manufacture of high class sterling silverware; in many forms of decoration it is the only process of reproduction that adapts itself to advantage. Castings made from a clean cut model possess an extremely artistic quality and character. Such work is usually made from a wax model and it is my purpose in this article to describe the making of these. This work is all handwork and is an unusually fine art, combining the work of both the sculptor and designer.

MODELING FOR SILVERWARE.

I will begin with full relief figures such as are used around the base of the prize cup illustrated. The modeler first constructs a framework of heavy wire as a skeleton to form his wax upon. He then roughly blocks out the subject, using his fingers to a great extent in this preliminary work, the few tools used for smoothing up and bringing out the details, etc., are of different sizes and shapes made of very hard woods, such as snake wood, ebony, or box wood. These are much a matter of personal choice, as they are usually made by the artist himself in accordance to his own ideas and method of working.

In this first constructive work the truly artistic ability and training show, as he must be thoroughly familiar with the anatomy of the human figure, its true proportion, and must be in harmony with the whole subject in hand. This is all identical with the sculptor making his first

sketch or model in wax or clay for his finished work in stone. However, the one difference is that the modeler for casting must keep in mind the practical possibilities of the reproduction of his work in the metal and its results, but the general principles are the same. The blocking out, finished to his entire satisfaction, well proportioned and poised, is then worked over carefully in detail to bring out the expressive features of the face, drapery and any decorative adornment, special care being taken to plainly portray the type, character and period of the figure represented. The three shown on the trophy are of Victory and Fame holding the traditional wreath above the winner, and were reproduced from very fine models. A more commercial use is shown in the handle and water lily decoration on the prize pitcher illustrated; in this case stock castings are used—that is, an indestructible pattern is cast in bronze from the original wax, chased up to a high degree of finish and made in two hollow sections of as near a uniform thickness as possible, thus reducing the weight of the more precious metal in the final castings. The handles on the coffee set, illustrating my article on "Designing" in the January number of THE METAL INDUSTRY, are also made this way.

On many sterling silver trophies and prize cups I have combined, castings in bronze and in either a verde or natural bronze finish form a very pleasing contrast with the gray iron.

As a rule the modeler prefers making his own wax while a good grade can be bought; nevertheless, there is great satisfaction in being able to use materials of one's own make, thus creating greater confidence and knowledge of his work. For the benefit of those interested I give two receipts for modeling wax, both of which are good if followed carefully: First—Best pure beeswax 1 part; fine rosin 1/12 part; best Venetian turpentine 1/16 part; melt in earthen pot, stir well, and add a little coloring matter; paris green will prove the best color. Second—Pure beeswax 1 lb.; Burgundy pitch 3 ozs.; clean lard ½ oz.; corn starch, teaspoonful; add a little coloring matter. Heat slowly in double boiler until thoroughly mixed. When cold either of these waxes should be worked in the hands until it can be drawn out in long soft threads between the thumb and fingers.

While it is not always necessary that the designer in the modern silver shop should be a modeler, far better results are obtained if he is. At least he should have a thorough knowledge of this work, thus aiding greatly in having his conceptions carried out to his complete satisfaction. Unfortunately, this is not always possible under modern shop conditions; still, as a rule, the two usually work in complete harmony. One thing should be borne in mind for effective results—broad handling should be cultivated rather than fine detail, as the general effect of the whole mass is what really counts in the finished work.

CYANIDE COPPER AND BRASS SOLUTIONS.

By C. S. BARBOUR, JR.

The fundamental law governing the handling of plating solutions in general is to have them rich in metal, or to resort to the vernacular, "keep the guts in." This not only results in better work, but in a saving of supplies, as for example, the old-time silver-plater used, in the course of a year, fully twice the amount of cyanide that is used to-day; this was due partly to the fact that silver, being more costly then, his solution, rarely contained over 1½ or 2 ounces to the gallon, while, to-day, 4 ounces to the gallon is the general rule for hollow-ware plating. All things being equal, a solution containing 4 ounces of silver to the gallon can be run at higher amperage than one containing less silver, resulting in a greater output. In theory, this same rule holds good in cyanide copper, brass and bronze solutions. In practice, however, we are hampered by the fact that a solution rich in metal also, contains a correspondingly large amount of inert salts, which are highly resistant and necessitate a strong current. This not only causes the liberation of the cyanogen, but evolves considerable hydrogen, resulting in burning of the work, streakiness or current marks and peelings.

When a solution is made with carbonate of copper and cyanide of potassium, the cyanogen, having a greater affinity for the copper, combines with it, leaving the carbonate to combine with the potash forming carbonate of potash, so that whenever more metal is added to the solution, we are also adding to its resistance. If, to overcome this trouble, we endeavor to use a solution low in metal, we find our work blistering. These facts have caused platers to consider brass and bronze solutions the most difficult to run satisfactorily.

A few years ago, in trying to overcome these difficulties, the writer made a brass solution with the aid of porous cells, running his metal in, as is sometimes done, with gold solution; this resulted in an ideal solution, free from all objections, but, from a commercial standpoint, was not practical. There has lately, however, appeared on the market a copper salt known as Red Copper Compound, which is almost pure copper, and enables the plater to add almost any amount of copper to his solution without the objectionable features. While there is no question as to the advantage derived by the plater from the use of this compound, both as to quality and quantity of his output, there might appear, at first glance, a question as to economy, the compound selling at between 50 and 60 cents per pound, while carbonate of copper can be bought below 20 cents per pound. As this question was brought forward by the purchasing agent, the writer kept careful account of supplies used and amount of work turned out of two solutions, one made with carbonate of copper, the other with the Red Copper Compound. Not only did this test show a large saving in the amount of the salts used, in favor of the latter solution, but also not one-half the quantity of cyanide was required to keep it in condition, this being due partly to the fact that the solution can be run at a much lower temperature, and partly to the fact that it was possible to carry much more metal in solution without adding to its resistance in the form of inert salts. A careful examination of figures showed that, notwithstanding the higher price of the salt, it had resulted in a saving of between 10 and 15 per cent. in addition to the saving in time.

In a brass solution, if the current used is too weak, the color will be too red, while, if it is too strong, it will be too white. A good plan is to dissolve the Red Copper Compound with cyanide, making a saturated solution (cyanide will take up its own weight of the compound); adding this to the brass solution until the color is quite red, increase the current until the desired color is obtained.

Another advantage gained from having a brass or bronze solution rich in metal is the ability to run at high amperage, which results in a harder deposit without burning, so that a lighter plate can be used, which will stand the same amount of buffing and wear as a heavier but softer deposit.

JAPS IN THE PLATING TRADE IN SAN FRANCISCO.

By Louis Gaenicke.

My doctor told me some time ago to quit the brass business and go into something else. Well, that advice was easy to give, but it was not so easy to follow; I took it under consideration. I have worked on watches, silverware, instruments, plumbing goods, scissors, store fronts, coffin trimmings, chandeliers, gas engines, Corliss engines, mining plates, cars, ship, cruiser and battleship work—now there might be something else I could hunt up to please my doctor. Well, I got it. James Graham Manufacturing Company (cooking stoves and steel ranges; over 50 moulders when full handed), of Newark, Cal., were looking for an A1 plater and polisher to take charge of their plant.

The proposition was this: Over a year ago the company had trouble with their men and to run their plant hired Japanese; I was to replace those Japs with white men. I took a run up to Newark and finally accepted. It took me over two weeks to get things in shape, during which time the Japs were discharged.

There are two nickel solutions, one about 450 gallons and one about 300 gallons, and one copper solution. I turned the steam pipe in both of them, at the same time fixing myself a seine of mosquito netting and cheese cloth, and this strained them for three solid days. I finally succeed in getting rid of the dirt. I boiled up more nickel salts and added until the density showed about 7½ Baumé, but still alkaline (carbonate of soda had been used by the Japs) which I soon remedied with sulphuric acid until the deposit showed the proper color, light blue tint. Before the surface of the deposit was rough, so that the nickel buffing had taken about as long as the polishing. They had been using an intense current. The commutator of the dynamo had to be re-turned. The switchboards were made out of heavy copper wire, just as good as none at all.

The Japs were coolies who had never worked at plating or polishing before. It was amusing to me to watch them plate. There was no wiring of the work while potashing; he would brush up a lot over the potash tank and throw it into the cold water tank, fishing each piece out, pumicing, rinsing, acid dip, rinse again and then hang the work on a rack dangling in the air over his head like a trapeze bar. Then he would go fishing for another piece in the cold water and so on until the rack had been filled up, when it was hung in the solution. The machinery was the noisiest I ever heard; there was no balance frame, nothing but canvas wheels were used for face work, as well as for round work. Take it all in all the experiment cost considerable.

In England the health of brass casters exercises the authorities to a considerable extent. The regulation providing for the installation of apparatus for the removal of fumes and dust have met with much opposition, particularly from well ventilated shops, and it is probable the rules will be modified. It has been recommended that sand casting shops having an air space equivalent to 2,500 cubic feet for each person be exempt, and also other shops with an air space of 3,500 cubic feet per person. The real trouble lies in the difficulty of making a distinction in the case of healthy and unhealthy shops, the line separating them being very hard to distinguish.

ETCHED NAME PLATES.

By Chas. H. Proctor.

In a commercial way name plates are mostly etched by the electric method. This is accomplished by a good plating battery or a small dynamo for small etching baths. The method usually followed is to prepare a solution of nitric acid in water, using 5 to 10 parts acid to 90 to 95 parts water. The tank may be of stone ware or wood lined by applying boiling coal tar pitch to make the wood impervious to the solution. Sheets of aluminum are connected to the negative pole and the name plates to the positive pole; by this method the metal is drawn from the surface uncovered by the etching ground. The etching is accomplished quickly, according to the strength of the current. Whole sheets are usually etched at one time and blackened out afterward. The back of the sheet is coated with air drying Japan thinned with benzole and flowed upon the surface or painted on with a camel hair brush.

For surface etching a rubber stencil or stamp is usually used; the "resist" applied in this manner is made up from heavy black printer's wax, the formula being 3 parts rosin, 1 part beeswax and 1 part printer's wax. These are melted together and applied to the stamp. Connecting wires are tacked on to the plate with soft solder; the wires are coated with asphaltum so as not to be acted upon by the current. When the etching ground is hard the plate is ready for immersion in the bath. A hundred name plates of the smaller sizes can be etched at once.

The filling used upon high grade work is usually colored sealing wax; for the cheaper grades these colors are mixed up with spirit copal varnish and applied with pencil brushes. They consist of white, blue, red, green, or almost any combination. They are generally applied before the etching resist is removed from the surface, especially when black filling is used, as a little benzine will remove it and does not affect the copal varnish. Ammonia carbonate of copper solutions are largely used for producing the black background.

FRENCH BAUXITE.

According to the United States Consul-General, of Marseilles, the exports of bauxite from France have increased to such an extent that the customs have given it a denominated place in the statistical tables for 1907, previous to which it had been entered with "undenominated minerals." He adds:

According to official figures, the quantity of bauxite exported from France in 1907 was 110,915 tons, valued at $471,113. The declared value of French bauxite exported to the United States from the Marseilles district during the years 1905, 1906, and 1907, amounted to $50,162, $55,787, and $108,207, respectively.

The French deposits, which were the first to be discovered, continue to be the most important in the world, both in extent and value. The first valuable beds were found in the neighborhood of Les Baux, a few miles to the west of Marseilles, which accounts for its name. At present the chief sources of supply are in the department of the Var, a few miles east of this city, from which export shipments are made. From a mineralogical point of view, bauxite is a non-silicated stony earth of the oxide family. It may be compared somewhat with corundum, and with emery, which is merely a variety of corundum. Indeed, one of the chief uses to which it is put in the United States is for the manufacture of an artificial corundum. It is also utilized in the United States for the manufacture of aluminum, alum, and various refractory products.

ELECTROPLATING APPARATUS.

An invention by Clarence G. Backus, and by him assigned to the Zucker & Levett & Loeb Company, of New York City, has the following objects in view: To enable the plating operations to be continuous in the sense that charges of articles may be added from time to time, the mechanism is in motion, the finished charges being removed as rapidly as the plating is completed; to render the apparatus automatic in its action and especially to enable the charges to be removed from the machine without the special attention of the operator and after they have been exposed to the expectrolytic action for an adequate length of time; to improve the means for gently agitating the articles being plated while they are in contact with the solution, and to increase the general efficiency of the many working parts useful in electroplating.

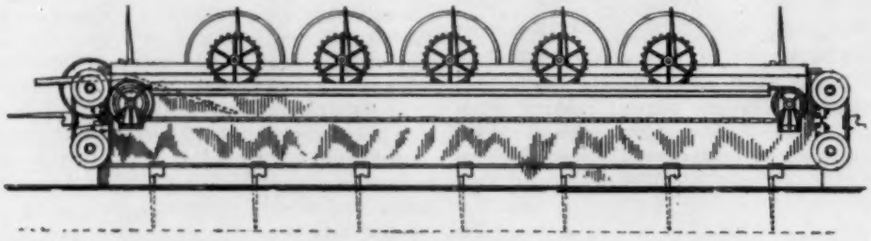


FIG. 1. SIDE ELEVATION.

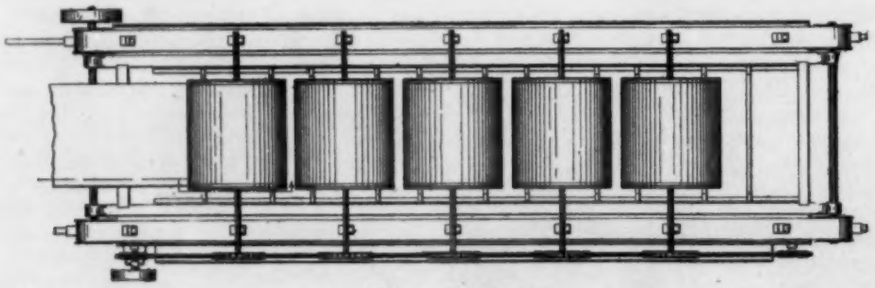


FIG. 2. PLAN.

Figure 1 is a side elevation of the complete apparatus, Fig. 2 is a plan view showing more particularly the runway for discharging the drums in succession as they arrive at one end of the machine, and Fig. 3 is an enlarged cross section through one of the drums and the bath, showing the means for turning the drums and for carrying them bodily along.

At opposite ends of the tank and arranged in pairs are pulleys upon which run two endless belts arranged upon opposite sides of the tank. These belts carry bearing blocks provided with faces resting upon rails which are supported by platforms having guides. Flights are mounted rigidly upon the bearing blocks and project upwardly therefrom, each flight occupying about 1/3 of the upper surface of the bearing block. Suitable provision is made for driving these belts.

There are a number of drums, Fig. 3, each having a shaft and within each is a U-shaped cathode. The materials to be plated are loose within the drum, being piled promiscuously over a portion of the cathode as will be understood from Fig. 3. The cathode, by being suspended from the shaft and having considerable weight, maintains a proximate vertical position and as the materials, because of their weight, seek the bottom of the drum, they cover a portion of the cathode and are always in metallic communication with the cathode and with each other.

Provision is made for rotating the drums and for moving them along through the tank. Provision is also made for controlling the relative speed of rotation of the drums and their movement through the tank; in this way the passage of the drums through the tank can be made sufficiently slow to allow thorough plating of the articles contained in them. When the articles are small, the current strong, and the solution in good condition, the device may be arranged to pass them through in much less time than would otherwise be the case; this is accomplished by changing the speed of the driving pulleys.

The articles to be plated are simply dumped into the drums so as to cover the cathode, as mentioned. When the machine is in operation the articles are being turned over and over, being sometimes in contact with the cathode, at other times out of contact with it, but in contact with other articles which engage it, or at least are in metallic communication with it. When the drums reach the incline they roll away, new drums being placed at the other end of the tank.

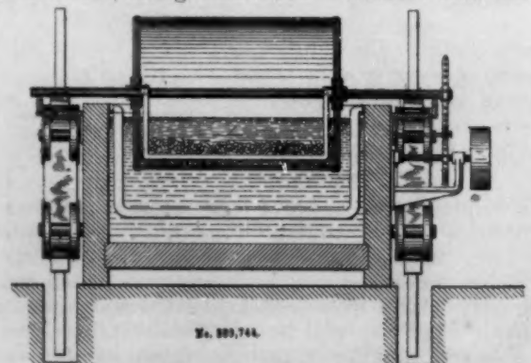


FIG. 3. SECTION THROUGH ONE OF THE DRUMS.

THE AMERICAN AND BRITISH METHODS OF FORMING METAL SOCIETIES.

By PALMER H. LANGDON.

The recent formation in America and England of two metal societies affords an interesting study of the different methods pursued by each country, for certainly they are in striking contrast to each other.

The American society, known as the American Brass Founders' Association, was formed in May, 1907, at Philadelphia, at the annual convention of the American Foundrymen's Association. The preliminary work before the convention was the circularization of firms who might be interested, asking them to attend the first meeting. As a result there was a very good attendance of brass interests, and in two meetings the society was formed, the officers elected, and the constitution adopted. The constitution, by the way, was built in half an hour by cutting down the constitution of the American Foundrymen's Association and substituting the name of the brass society. It was read before the members for the first time on the following day, put to a vote and accepted as the society's guide. A year later, when the association met at Toronto the constitution was already found wanting, and was re-drawn by a committee, and voted upon at a meeting the next day, the same as a year before.

The name of "The American Brass Founders' Association" was adopted as being a suitable one, inasmuch as the society was connected with the Foundrymen's Association. But a few months after the society was established it was seen that the name was a misnomer as the object of the society was to take in all firms interested in metals, and the Secretary's monthly reports frequently mentioned the fact that though the society's name was The American Brass Founders' Association, it was formed for all classes of metal manufacturers, and it was hoped that they would join, and so forth. This year the unsuitableness of the name was generally recognized, but it was not thought advisable to change it on account of the society's connection with the American Foundrymen's Association. This brief outline gives an idea of how quickly the American Brass Founders' Association was formed.

Now, turning to our British friends, we see that the conservatism for which the British nation is famous is applied even to the formation of a metal society. At first, a few men believing there was room for an organization which would be to the metal industry what the Iron and Steel Institute is to the iron industry of Great Britain, issued a call for a preliminary meeting, the first one of which was held in the city of Manchester. There the matter of the new society was talked over by a number of leading men, and it was decided to hold a second meeting three months later before the society was entirely organized.

At the first meeting it was decided that the society would be open to membership to practical and scientific men at home and abroad, and the question of a suitable name came up and was given ample discussion. According to British customs it was to be called an "Institute," but whether a "non-ferrous metal institute" or " a brass and copper institute" was the open question. After a very complete discussion the "Institute of Metals" was happily chosen as the most suitable name. Steps were also taken to canvass for membership to have every branch of the metal industry represented. To see how thoroughly this was done we have but to glance over the list of members and see for ourselves. We herewith print the names of the Council only, which tells the story—the Council corresponding to the American Executive Board. Here are the names and the interests that they represent:

Sir W. H. White (President, Prof. Gowland (Science), Prof. Turner (Science), Mr. J. T. Milton, Vice-Admiral H. J. Oram (marine engineering, Dr. F. Elgar, Mr. A. F. Yarrow (chip-building), Mr. Odo Vivian, Mr. L. Sumner (copper), Mr. J. D. Bonnor (Brit. aluminum), Mr. Ristori (aluminum), Mr. G. A. Baeddicker (nickel), Mr. Norman Cookson (lead antimony), Mr. G. W. Nisbett (cables), letter regretting absence, Mr. R. Kaye Gray (cables), Mr. J. A. Bayliss (King's Norton Metal Co.), Mr. G. B. Hunter (shipbuilding), Mr. Williams Harvey (tin), Mr. Hurry Riches (loco. engineering), Mr. Cecil Wilson (Sheffield Smelting Co., precious metals), Mr. Ralph Heaton (the Mint, Birmingham), Mr. Corfield (Dilwyn and Sons, spelter), Prof. H. C. H. Carpenter, Mr. W. H. Johnson (joint hon. secretaries).

In its President the Institute has one of the most noted men of Britain: Sir W. H. White, formerly Chief Naval Constructor of the British Navy. The joint-Secretaries are Professor H. C. H. Carpenter (Manchester University), and Mr. W. H. Johnson (of Richard Johnson Clapham Morris, Ltd., of Manchester, a firm which has been transacting a metal business for over a hundred years, its ledger accounts showing transactions in tin before there were railroads).

At the second meeting, held in London, June 10th, the Institute of Metals was formally launched, with the officers and council board mentioned above, but even at this date no constitution was adopted. The committee which was appointed for drafting the laws was given ample time to first prepare a constitution in printed form, and then send proofs to the different members that they might criticise, object, or suggest changes, thus giving every member a chance to express an opinion on the framework of the society. When this has been done the committee will report on the consitution. It can readily be seen, therefore, that the utmost care has been taken in all the preliminary steps of forming the Institute of Metals, and how much opportunity was given each member to express his opinions and ideas about the society.

In an interview with Mr. William H. Johnson, one of the secretaries, and the leading spirit in forming the Institute, he said:

"We have planned to hold our meetings twice a year similar to the Iron and Steel Institute and we expect to issue a similar publication. I presume it will be small at first and may appear only quarterly, but we hope in the future to make it a monthly, and to keep it up to the same high standard of useful information as our iron society. Our meetings will be held in the different cities of England, and eventually we hope to hold a meeting in America. As our society is international in its scope we expect to have many foreign members, and hope that we will have many from the States. I believe there is a most useful future for the Institute of Metals."

This, briefly, was the way the British society was formed, and, of course, Englishmen have the advantage of their large cities being within a few hours journey of each other, therefore enabling a larger attendance, and the holding of more frequent meetings, thus forming a closer community of interests. But even with this geographical advantage it is seen that the Institute was formed most carefully and started

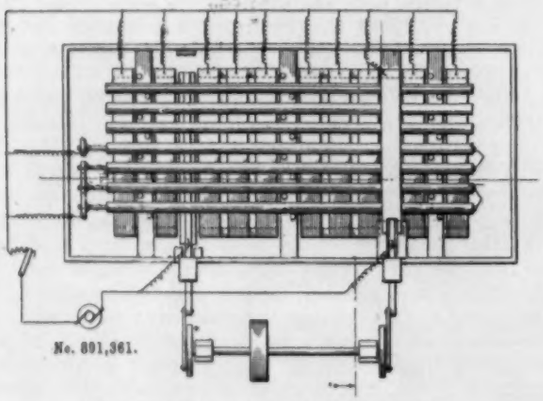
with the leading men of the metal industries in the United Kingdom.

In America the conditions were entirely different; the great distance between the cities and the limited time of the manufacturers for societies, it may not be possible to take the pains when forming a society that they do in Britain. However, as mentioned at the start, the contrast of the different methods is worthy, we believe, of the attention of the members of the "Association" and Institute.

DEVICE FOR ELECTROPLATING RODS, PIPES, ETC.

Heretofore it has frequently happened, in electroplating the inside of pipe, that the internal electrodes, which are usually of the same material that it is desired to deposit, have become bent and, as a result, caused unequal deposits at different portions of the internal surface of the pipe. It is the aim of an invention for which letters patent were issued to Daniel H. Murphy, of New Castle, Pa., June 23, 1908, to overcome this trouble by providing apparatus that will equalize the electrolytic action between the anode and the inside of the pipe.

In carrying out this idea the internal anode is held in a rigid manner so as to be incapable of rotation, while



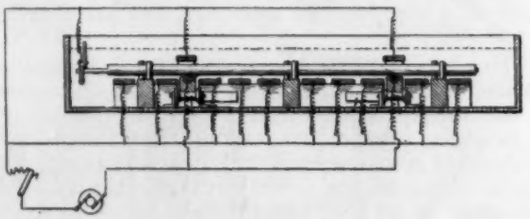
ELECTROPLATING RODS—PLAN VIEW.

the pipe within which it is secured is caused to rotate. As a result of this, since the anode rests upon the inner portion of the pipe, being removed therefrom by suitable insulation, the electrolytic action from the anode to the pipe is maintained uniform and an even, smooth coating of the material used is secured.

Another object is to equalize the deposit upon the inner and outer surfaces of the pipe, when both are to be plated. This is accomplished by using an electrolyte containing the material to be deposited and by using other material than that to be deposited for the internal anodes, while the anodes used outside the pipe are made of the material to be deposited. As a result of this the material deposted on the inside must necessarily come entirely from the electrolyte, and hence the action is slower than would otherwise be the case and a uniform coating is secured, but on account of the relatively short path or current flow from the internal anode to the inside surface of the pipe compared with the current flow from the outside anodes to the outside surface of the pipe, the actions inside and outside of the pipe are practically equalized, so that at no time is there an excessive deposit inside the pipe.

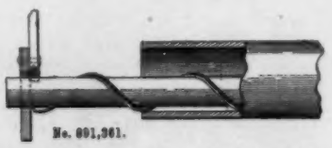
Since the internal anodes do not rotate it is possible to make rigid connection between the outside circuit and them, and by this means improve the results. It is explained that the reason for poor results in this connection, in processes heretofore used, was that on account of the poor contact usually made between the internal anodes and the conductors with which they were in working contact, there was great tendency to wide variation in resistance at such contact and hence great variation in the character of the deposit at different times. By using internal anodes of stiff metal, as iron or steel, when it is desired to deposit softer metal, as lead or zinc, the cost of production is much reduced, since the first cost of the anodes is much less and the waste of material deposited is almost entirely eliminated.

Of the accompanying drawings Fig. 1 is a plan view, Fig. 2 a longitudinal section and Fig. 3 an enlarged view of one end of a pipe having the interior anode in place. To affect the plating of the inside of the pipe internal anodes are used, extending from one end of the pipe to the other and rigidly secured to one ter-



ELECTROPLATING RODS—SECTION.

minal of the circuit. In order to prevent the internal anodes from making electrical contact with the pipe, a strip of insulation, composed of twine, rubber, or



ELECTROPLATING RODS—DETAIL.

similar substance, is spirally wound around the anode. The pipes and rods being plated are carried upon the conductors arranged on the floor of the tank, and which are moved to and fro during the plating operation.

Last year the production of spelter in the United States amounted to 249,612 tons as against 225,494 for 1906. Also during the year there was a great increase in the smelting capacity.

There are at the present time in Japan 32 timepiece factories, and the annual output is 209,792 standing clocks, 441,755 hanging clocks, and 25,360 watches, the whole representing a value of $794,900.

The platinum industry in Columbia is attracting considerable attention from abroad. The properties are being secured to carry on development. Most of the deposits are also gold bearing, and have been worked for the gold for many years.

HOLLOW HANDLE CUTLERY.

By C. W. Cook.

The hollow handle cutlery branch of the plated ware business is a very important feature. The blades, tines and tangs for this class of work are forged out, ground and finished in a regularly equipped cutlery plant.

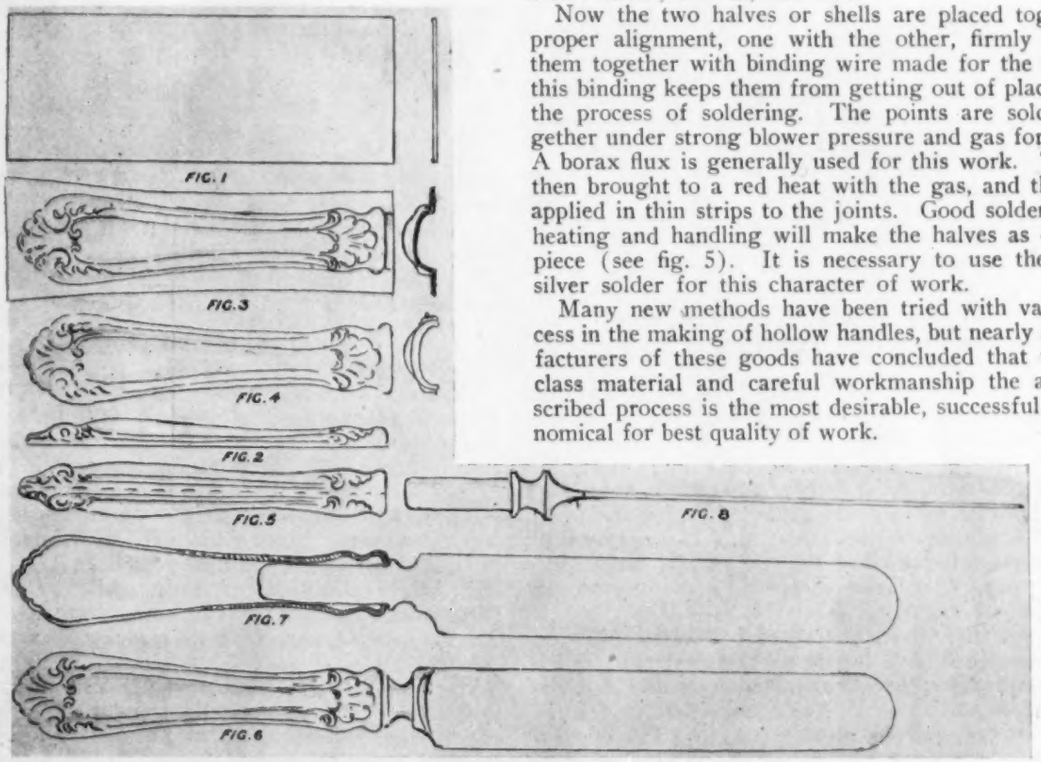
The stock from which the blades, tangs, etc., are made is the best selected crucible steel, treated for this special line of work. Great care and best workmanship are required in the various operations of forging, grinding, and finishing these articles. For hollow handle cutlery they must be made and finished throughout in the best manner, so there will be no flaws or imperfections at any point. They must be light, strong, and durable, to stand the strain required for family use. One very important feature of a first class blade is the temper, and it requires skill and experience to have the temper just what it should be.

A well made and well tempered blade is strong and flexible, will bend and have the snap and elasticity in a degree the same as the old Damascus sword, when the point could be bent to touch the hilt and spring back to place as straight as before. We sometimes see hollow handle cutlery marked Damascus steel, and razor steel, which goes to impress the purchaser with the superior quality of the stock used in the manufacture of these goods.

Having our blades well made and finished, we proceed to make our handles. Many are made of sterling silver, but go through about the same operation as those which are plated. In making up the handles we take a blank of German silver or other metal the proper thickness (see fig. 1), place this blank on a die which is cut out to shape of ½ of handle; the pattern is also cut in this die. We now make a hub and fit this to the die so it fills at every point. We now place our blank on this die and under heavy pressure of a Peck drop hammer force the flat blank down into the die until form and figures of ½ handle are brought up full at all points. This operation requires two or more blows of the drop to get the desired results (see fig. 2) for shape of ½ handle; after being formed as described, Fig. 2 is side, Fig. 3 flat view of same. Now cut the shell for ½ of handle as formed in suitable die, made to conform in outline to impression of forming die. Now we have the shell formed and cut out to shape of ½ handle (see fig 4) and we then proceed to make the handles complete. The edges of shell are left with a burr and rough from the cutting die; this we take off on emery wheel, leaving shell or ½ of flat part of handle clean, smooth, and true.

Now the two halves or shells are placed together in proper alignment, one with the other, firmly securing them together with binding wire made for the purpose; this binding keeps them from getting out of place during the process of soldering. The points are soldered together under strong blower pressure and gas for heating. A borax flux is generally used for this work. They are then brought to a red heat with the gas, and the solder applied in thin strips to the joints. Good solder, care in heating and handling will make the halves as one solid piece (see fig. 5). It is necessary to use the best of silver solder for this character of work.

Many new methods have been tried with varied success in the making of hollow handles, but nearly all manufacturers of these goods have concluded that with first class material and careful workmanship the above described process is the most desirable, successful and economical for best quality of work.



DRAWING OF STEPS IN THE MAKING OF HOLLOW HANDLE CUTLERY.

All first class handles are loaded in end before joining to blade; the object of this is to counterbalance the blade, so that when it is complete the handle and bolster only will rest on the table, leaving the blade above the surface and not coming in contact with table at any point of blade. The blade is then soldered to handle with best quality of soft solder made especially for this work, which makes a strong and durable connection of handle and blade.

After the knife or other article is complete as above (see fig. 6) it is probably finished and inspected, all imperfections laid out for refinishing, etc., and only perfect work goes to the plating room. The handles of all articles made are plated with a good, substantial deposit of pure silver. Tea knives and many other pieces are plated all over both handle and blade, but usually dinner knives and carving set pieces are plated on handles only. The blades, tines, etc., on these pieces are finely finished in the steel, and can be sharpened when they become dull from constant us. Hollow handled cutlery is packed in several ways for the market, but usually in what is known as combination sets, which consist of 6 knives

and 6 forks in box, or 6 knives only. Carving sets are usually packed for market in sets. The dinner set is made up of carving knife, fork and steel or sharpener. These sets are put up in very attractive boxes, some being silk lined, and make fine display in showcase or window. Fig. 7 shows view of ½ handle with tang or blade inserted ready to solder together. Fig. 8 shows back view of steel blade ready to join to handle.

MANGANESE BRONZE.*

By C. R. Spare.

It is not the intention of this paper to review the history of the development of the various manganese bronzes up to the present day, but to outline briefly the vastly extended uses to which these valuable alloys have been applied in recent years by the various industries and, more especially, to point out the methods of testing employed and the physical results obtained.

The best present-day alloys of manganese bronze are the results of years of scientific research by several of the largest manufacturing concerns in the world, who maintain chemical and physical testing laboratories in connection with their brass foundries. Of all the metal industries, brass founding is almost the last to pass from the empirical and rule-of-thumb to a scientifical metallurgical basis. In fact the majority of the brass and bronze manufacturers to-day have never used chemical analysis or a testing machine and, therefore, have only a general idea of the composition and physical properties of their products. This is the result of natural conditions, which years ago did not impose severe requirements on brass and bronze.

To-day conditions have changed, or are changing, and engineers have multiplied powers and manipulated pressures beyond all former figures. Machinery is more powerful, more complicated and more severely tested than ever before, and while steel and other industries have made great advances and kept space of requirements, the same ratio of improvement has not been maintained in the copper and brass metals, excepting in the case of the high tensile strength manganese bronzes.

There are several brands of manganese bronze on the market, each with its own characteristics, which are determined by the chemical composition and the process of manufacture. While upon analysis some of these bronzes do not reveal striking differences in composition, yet these alloys are susceptible of wide variations in physical properties by slight changes in composition, difference in quality of raw materials and methods of melting and mixing.

Certain impurities affect very injuriously the strength and ductility of manganese bronze, causing brittleness and crystalline texture. It is not within the compass of this paper to discuss these differences, but they become very evident in the testing machine.

APPLICATIONS.

Manganese bronze first found its important practical application in the manufacture of propeller wheels for ships. Now, cast iron and cast steel have been almost universally displaced by it, not only for all naval vessels, but the merchant ships of the world have adopted it as standard practice. Marine engines have been increased to such vast powers, especially during the past ten years and since the advent of the steam turbine that 20,000, then 40,000, and now 70,000 I. H. P. are transmitted through manganese bronze propeller wheels. In some ships the speed runs upwards of 300 revolutions per minute.

PHYSICAL PROPERTIES.

There is no metal of equal strength and toughness which will produce such sound, smooth and intricate castings, true to the form of the pattern. These qualities permit of the maximum fineness of section of the propeller blade, and at the surface speeds of thousands of feet per minute, the surface friction is reduced to a minimum.

This bronze is practically incorrodible in sea and alkali waters. Likewise dilute acids and acid mine-water are withstood very successfully. Long-time tests have been made with the various acids and mine waters. Cast blocks of manganese bronze immersed in the most acid mine water in Pennsylvania, containing about 300 grains sulphuric acid per gallon, for one year, showed no material corrosion and a test piece cut from this metal showed no diminution in tensile strength over a duplicate specimen previously tested.

TESTING.

Test pieces cut from cast propellers should show an average ultimate tensile strength of 70,000 lbs. per sq. inch, elastic limit of about 35,000 lbs., or one-half the ultimate, elongation in 2 inches, 25%, and reduction of area, 25%. The reduction of area follows the elongation closely in cast manganese bronze.

These figures can be varied to suit requirements. A soft manganese bronze having an ultimate strength of 60,000 lbs. per sq. inch and 40% or 50% elongation in 2 inches is the lower limit, while an exceedingly hard manganese bronze can be made to test over 90,000 lbs. per sq. inch with even as much as 30% elongation.

The methods of testing manganese bronze physically do not differ materially from the standard methods for steel. Test pieces, according to the U. S. Government standard sizes, .505 inch, .798 inch, or 1.000 inch diameter are machined 2 inches between punch marks, and threaded. In the case of castings there is not a sharply defined elastic limit, and the yield point cannot be determined by the drop of the beam. A multiplying divider (such as devised by J. A. Capp), or a standard extensometer will establish quite closely the point at which an appreciable change in the rate of stretch takes place. In the case of rolled or forged manganese bronze, the yield point is more closely defined and the elastic curve is frequently sharp enough to detect the drop of the beam or halt of the gauge wheel.

In compression, cast manganese bronze, if properly made, shows an average elastic limit of 35,000 to 40,000 lbs. per sq. inch, and a maximum crushing load of 90,000 to 100,000 lbs., per sq. inch. Rolled or forged manganese bronze tests 50,000 to 60,000 lbs., elastic limit and as high as 130,000 to 150,000 lbs. maximum crushing load.

ROLLING AND FORGING.

Manganese bronze can be rolled or forged readily at a red heat with the production of an exceedingly

*Paper read before the American Society for Testing Materials, at convention, June 23-27, 1908.

tough, dense and close-grained metal. Microscopic examination of cast manganese bronze after polishing and etching reveals a very homogeneous and uniformily grained metal, but after rolling or forging to a sufficient reduction the structure is reduced to from 1/30 to 1/50.

Rolling and forging raise the proportional elastic limit to from 45,000 to 75,000 lbs. per sq. inch, depending upon the finishing temperature and the amount of work done on the metal. Likewise the ductility and toughness are increased without, however, a corresponding increase in ultimate strength.

Forged and rolled rods find a wide application as piston rods, shafts, axles and for all purposes where a metal of equal strength and toughness to carbon steel is desired, and which will not rust or corrode in the atmosphere, mine or sea water.

An especially soft and tough metal is made to resist vibratory and sudden stresses and shocks. It is used under very severe conditions in modern naval ordinance. It also is finding application in staybolts for locomotives. This bronze tests 40 to 50% elongation with about 60% reduction of area.

Thus only a few of the better known applications of manganese bronze have been pointed out.

The electrical industry is calling for it for turbo-generator sets which are run at speeds up to 4,000 revolutions per minute, and the blades of the steam turbine are satisfactorily made of extruded manganese bronze shapes. In this case the erosive action of high pressure steam is a severe condition under which most metals fail.

APPLICATIONS.

The infant industry of this country, which has grown to such lusty proportions, the automobile, has set a very high standard for materials, which must stand up under its peculiarly hard service conditions. Automobiles with gasoline motors of 60 and even as high as 130 H. P., at speed of 1,000 to 1,500 revolutions per minute and running over all kinds of roadbeds at 60 and 100 miles an hour, have stimulated the improvement of the materials entering into the construction more, perhaps, than any other modern machine. The nickle chrome and other high-grade steels have produced results never heard of before, and cast iron has been wonderfully improved by the requirements of automobile cylinders. Likewise manganese bronze, formerly used almost exclusively for warships, has been adapted to produce forgings and castings which will not crystallize or fail under similarily severe conditions.

As stated at the outset, it was not the purpose of this paper to explain the theory or history of the deoxidation of copper by means of manganese, but it has been attempted to outline the growing application of these alloys and to present a general idea of the physical tests obtained by several Government and private testing laboratories, with the hope that the engineers of this country will become more interested and better acquainted with these alloys.

United States Consul, writing from Chemnitz, states that one of the oldest and best-known silver mines in Europe, that of Freiberg, in Saxony, is soon to be permanently closed, after a practically uninterrupted period of working, dating back to 1,163. The reason for this is the low price of silver, and that it is economically impossible to compete with the richer ores of America. In order not to inflict great hardship upon the mining population of Freiberg the mines will not be definitely closed until 1913.

NOTES ON THE DESIRABILITY OF STANDARD SPECIFICATIONS FOR HARD DRAWN COPPER.*

By J. A. Capp and W. H. Bassett.

Until within the last few years, hard-drawn copper wire has been used principally for telephone and trolley lines. With the increasing development of hydro-electric plants where the generating stations are apt to be at considerable distances from the point of application of the power, there has been a widely growing use of hard-drawn copper wire for the transmission lines; and the time seems ripe for the preparation of specifications for hard-drawn copper wire, which should be fair and reasonable from the standpoints both of the manufacturer and of the consumer.

PRESENT SPECIFICATIONS.

The specifications already in existence agree only in that they all require certain minimum conductivity and tensile strength, and that they permit certain variations from nominal diameters. Generally speaking, however, no two of those agree in what should be the minimum permissible tensile strength, or variation in diameter, and many of them include other requirements such as a minimum elastic limit, a minimum number of twists made in different ways and on different lengths of wire and at different rates of rotation. Most of the specifications require a certain minimum elongation, which is measured in various original lengths and under different conditions. It naturally is often the result that in a given specification the attempt has been made to cover all of the apparently desirable characteristics; and it sometimes happens that the maxima in opposed properties are stated as the specified requirements.

The electrical conductivity of the wire is probably the most nearly fixed of all the characteristics demanded; and yet there is an unexpectedly wide range in the electric conductivity called for in the existing specifications.

TENSILE STRENGTH.

The tensile strength of hard copper wire is greatly influenced by the actual amount of reduction in section of the wire in the cold drawing operations, and nearly all of the specifications for tensile strength are practical in that they can be met. Obviously, however, the elongation of the wire must decrease with increasing amounts of cold drawing, hence there must be a compromise between the maximum tensile strength and maximum elongation in order that hard wire may be made and yet produced economically to meet specifications. With respect to requirements, such as the twisting and wrapping tests, it is a fact that the results vary so greatly with the way in which the test is made and with changes in outside influences, that unless all conditions are very carefully defined and observed, the results of the tests themselves are practically valueless.

GAUGE.

Another matter which seems worthy of consideration is the variation in practice in specifying the gauge or size of wire, there being not less than three distinct wire gauges used, as well as some modifications or special interpretations of the values of the gauge numbers. It would greatly simplify matters and make reference definite if some general agreement could be arrived at, whereby the size would be specified in decimal parts of an inch without reference to arbitrary gauge numbers.

*Paper read before the American Society for Testing Materials at the recent convention at Atlantic City.

RANGE OF REQUIREMENTS.

To indicate the large range of requirements of existing specifications, we propose to give a few examples. One specification which recently came to our attention requires a tensile strength of not less than 60,000 pounds per square inch, with a minimum elongation of 1% in 10 inches, and an elastic limit of not less than 36,000 pounds per square inch, the specification appearing to apply to all sizes of hard-drawn wire which the company issuing it desired to purchase. The size of wire which was called for on a particular inquiry in the case just mentioned, is required in another specification to have a minimum tensile strength of 62,000 pounds per square inch with a minimum elongation of 1.14% in 60 inches. Elongations are measured under this specification with stress applied to the wire; while it is to be presumed that under the first specification the elongations are to be measured after the wire has been broken. A third specification requires this same size of wire to have a standard strength of 64,200 pounds per square inch without any elongation being specified. These three specifications may be considered typical. There is a difference of 7% in tensile strength actually required of a given diameter of wire, and furthermore, a difference of 500% in the length upon which the elongation is to be measured. One specification requires the wire to be broken and the elongation then to be measured between bench marks originally placed upon the wire; while another states the whole elongation which has taken place before fracture occurs, and includes the degree of elasticity remaining in the wire at the time of fracture.

There is another difference to be noted among the three specifications quoted. One of them apparently requires the same tensile strength in hard-drawn wire, regardless of its size; and another demands an increasing strength with decreasing diameter, and the increase in strength is uniform with decrease in diameter. It is probable that the relation between diameter and tensile strength follows a curve rather than a straight line; and commercial practice in the manufacture of the wire is likely to cause jogs in this curve. If these jogs are not permitted in the curve, it will materially complicate manufacturing conditions.

The elastic limit of the wire is included as a requirement in some specifications and is omitted in others. That it is difficult to locate with any degree of exactness is obvious. The coiling of the wire sets it in a curve and leaves it in a state where one side is strained to a greater degree than the other when the wire is pulled straight in the testing machine. There is apparently no jog in the elastic curve corresponding to that at the yield point in steel, hence the elastic limit cannot be located, even with fair approximation, by the drop of the beam or increase in stretch rate in the manner customary in steel testing. Recourse must be had to the tedious method of taking extensometer readings, from which the elastic curve may be plotted. Because of the unevenly strained condition of the wire just mentioned, the elastic curve has puzzling inflections, probably caused by small sets taking place on the overstrained side. These make the location of the true elastic limit uncertain. The time consumed in making the test is more than a mill laboratory can usually afford. This, combined with the uncertainties in the results, makes it a debatable question whether it is not better to determine, with fair approximation, the probable ratio of the elastic limit to ultimate strength, for the benefit of the designer; but to omit the location of the elastic limit from specifications and as a regular inspection test.

THE TROLLEY LINE PROBLEM.

A trolley line, or even a telephone line, does not present any difficult problems involving the actual physical strength of the wire of which the line is constructed, because the spans are short by reason of the comparatively small sag that is permitted in such lines. With a long-distance transmission line the case is somewhat different. It frequently happens that the availibility of a water power is to a considerable extent determined by the cost of the transmission line for conveying the power to the desired point of application. The cost of the transmission line is made up not only of the copper wire entering into it, but also of the poles, the insulators, and the method of suspension. The size, and therefore the cost, of the copper wire itself is to a large extent fixed by electrical considerations. Hence the variable factors in cost may be said to be suspensions, including poles, insulators, etc., and the longer the spans the less will this cost be. The permissible length of span is obviously determined by the physical characteristics of the wire and the amount of sag which may be tolerated. Hence the engineer who is designing the transmission line must have accurate knowledge of the physical properties of the wire entering into it.

While hard-drawn copper wire and its uses may be of less general interest than some of the problems arising through the use of the more common engineering materials, the extention of electric driving in railroad practice brings this matter under the consideration of many more of our members than might at first be supposed. On this account, and with the hope of interesting the Society and having the subject taken up as has been done with many other materials, these notes have been prepared.

BRITISH NOTES.

(From Our Birmingham Correspondent.)

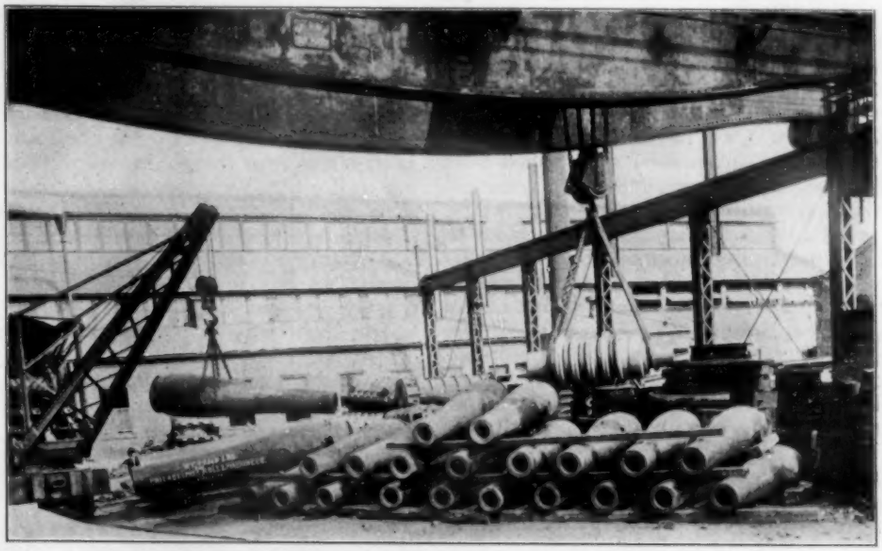
JEWELRY DESIGNS.

Some severe reflections were made upon the character of modern jewelry by Ll. B. Rathbone in a lecture to the students of the Birmingham School of Art. They all knew, said the speaker, the jewelry of ordinary commerce which they saw in shop windows. It would be well if they could sweep it all into the limbo of forgotten things. While it would be unfair to describe it all as hopelessly inartistic and bad, the great majority was trivial and uninteresting in design and its aim was more often showiness and ostentation than any refinement or beauty. A great deal of it was almost entirely machine made. But ordinary commercial conditions were not favorable to the growth of artistic work, and most of the ordinary commercial jewelry was deplorable evidence of the vulgarity and ugliness of the age.

The lecturer proceeded to show how, by using elementary forms as units and material for designs, very artistic effects could be produced. To illustrate this, he showed a series of 101 different regular forms made out of a short bit of silver wire, and then showed how each of these forms could be treated in small groups. Other illustrations demonstrated the use of various twists and plaits, and exhibited other methods of enrichment of plain forms. It may be added that Mr. Rathbone is one of the best known experts in artistic metal work, a member of the Arts & Crafts Exhibition Society, who for a long time had charge of the classes for the teaching of artistic metal work and jewelry at Liverpool University.

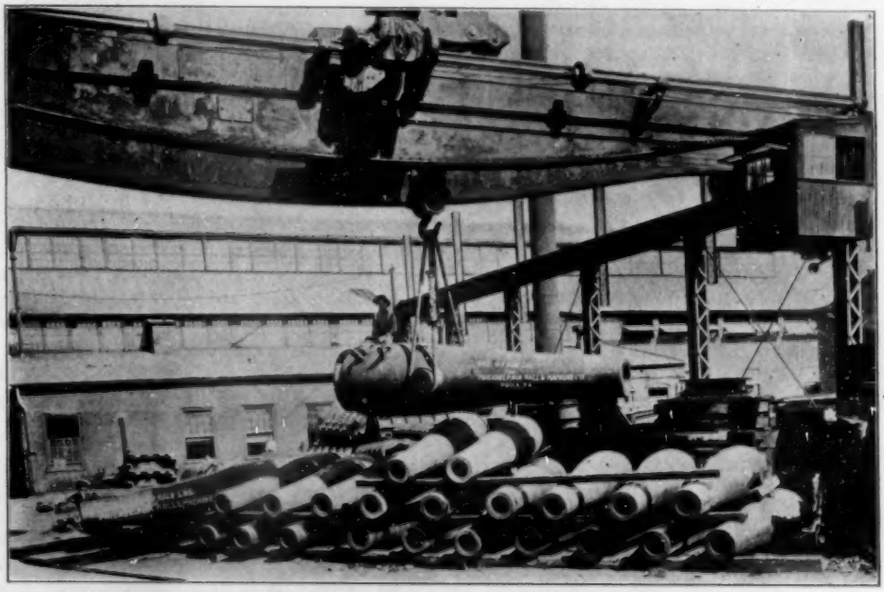
MAKING ROLLS OF OLD CANNON.

At the present time when the conservation of our natural forces is being so widely discussed, the utilization of what would otherwise be waste material is of particular interest to all those engaged in the various industries. To the metal industries the use of our old discarded cannon constitutes such a case. The form and size of these cannon militate very largely against their being commonly utilized as a scrap material, and the cost of handling and breaking is so high as to prove prohibitive except to those engaged in the manufacture of a product which demands an especially high quality of material. To those so engaged, however, the old cannon are exceptionally valuable. Among the largest and most successful of those, whose product demands such material, is the Philadelphia Roll & Machine Company, of Philadelphia, Pa. This concern manufactures cast iron sand and chilled rolls and general machinery for rolling mills and also dies, gearing, and general castings where the quality of the material has to be of the very highest grade. They are enabled to meet these requirements largely through the use of cannon, the strength of which forms one of the essential qualifications of their product.



SMALLER GUNS AND ROLLING MILL ROLL MADE FROM THEM.

The majority of these guns had been cast at the West Point Foundry a great many years ago, and at the time of their manufacture were the latest and strongest type of gun. After finishing, they were subjected to a rigid inspection and were then forwarded to the different points where they were to guard the safety of our great nation. Some of them were then sent to old forts, others were placed at points along the seaboard as coast defense guns. All of them played an important part in the history of our country.



OLD TYPE OF GUNS BEING UNLOADED.

After having been purchased these guns were rapidly dismantled and shipped to the purchaser. Their weights

range from 15,000 pounds to 50,000 pounds, the coast defense guns being of the latter type. Some conception of the size of these guns can be formed from the fact that only one can be shipped on a modern freight car, and also from the photographs herewith. One of these photographs shows the guns which have already been unloaded and one of the large coast defense guns being unloaded at the works of the Philadelphia Roll & Machine Company; the other shows one of the smaller type guns suspended, and also a rolling mill roll which is one of the principal products of which they form an essential part.

After the arrival of the guns at the works they are cut into pieces weighing from 3,000 to 5,000 pounds. This cutting presents one of the many problems connected with the utilization of the larger type guns and is performed in very large lathes of especially heavy construction. The cuts are only extended a limited distance into the material, as it is dangerous to the machine to make the cuts sufficiently deep to risk any chance of premature breakage. After enough of these cuts are made, the gun is removed from the lathe and taken to a large breaker of the gravity type where the gun is broken into pieces corresponding to the cuts previously made. They are next loaded into large furnaces of special construction and melted, together with a proper quantity of other high-grade charcoal iron. This molten mixture is drained into large ladles, which are provided with suitable means for pouring the metal. The ladles are then raised by electric travelling cranes and carried to the previously prepared molds into which the molten iron is poured. The larger part of these molds are for rolls.

These rolls are now taken into the machine shop where all parts are turned perfectly true and they are then ready to be shipped to the rolling mill where they perform their active work. This work is done on iron, steel, brass, copper, nickel, silver, and gold in all variety of shapes.

Thus these discarded, obsolete, and apparently worthless cannon play a very important part in our daily existence and progress, and their life does not end with the life of this roll of which they form a part, for after these rolls are worn out or broken they are sent back to the manufacturer, who again remelts them, with other high-grade pig-iron and some fresh pieces of cannon, and they are again cast into new rolls, which, in their turn, go out and perform the work of their predecessors, and this process will probably be continued as long as any old cannon can be obtained.

It took years of effort and many failures before scrap iron could be used in high-grade materials, and only very lately has its use been intelligently understood. Yet, as we have shown, the point has now been reached when some grades of scrap iron are prized more highly than new pig-iron.

MIXING METALS.

By Thomas Clare.

When alloying gold or silver, in fact, in the making of any composition such as german silver, brass, bronze, etc., the first principle is to vigorously stir the mixture so that it will be thoroughly mixed. To do this (no matter what composition is being made) take the ingredients that melt at the highest temperature, such as nickel, copper, scrap and all heavy pieces, and get this nicely melted and stirred well; then put in the zinc, tin, or lead, as the case may be. When all the ingredients are in, the mixture should be thoroughly stirred from the bottom of the crucible as it is most important that the heavy metal should be mixed with the lighter portions on the top.

This is the failing of a great many men—they do not stir enough and thereby make lots of trouble for those who use their castings. This, I think, is done mostly for want of thought, as most men would stare with astonishment if told they did not stir their metal enough; but it is a cold fact. I can vouch for this as I have had more trouble with men over this one thing than any other. What I claim is that stirring the metal toughens and makes it more tenacious; also that you get a better and steadier stream when pouring and, last but not least, the last piece to be cast is the same as the first. I know of furnace men working in both large and small bronze foundries who charge a crucible outside the furnace. They place the copper in the pot, then the zinc in around the copper, and then put the crucible in the furnace. When that charge is melted they put in the lead, but never by any chance do they use a stirrer. Now, I claim this bronze is not properly mixed and the loss of zinc must be enormous.

The right way to make good bronze is to melt the copper first, put in the zinc and stir thoroughly; then put in the lead and stir as before; then pour and, without a doubt, you will get better bronze and the loss will be considerably less.

When melting metal for rolling purposes it must be constantly stirred to get the most intimate mixture of the ingredients. A metal not thoroughly mixed is liable to crack in the process of rolling. A metal well mixed will stand up better under the hammer and drop, or in the draw bench.

Some time ago I was hired by a firm (silversmiths) to correct their german silver which had gone wrong, and while working there I saw the sterling silver melter at work. He never used a stirrer once. I am aware some claim it is not necessary. In this instance the sterling scrap, fine silver and alloy were weighed out before being sent to the melting room.

Now, I claim this system is wrong because the proper mixture cannot be obtained. If a piece of work made from silver melted in this way gets into the assay office, it is liable to be found under the standard; and the manufacturer is fined through no fault of his, but because the metal was not mixed. Again, pieces made from the same melt might run above the standard. Some melters, instead of using a stirrer, melt their silver twice; this mixes it some, but the method is not so good as that just mentioned.

I claim that any metal with one per cent. of alloy needs as much stirring as a composition with 20 or 30 per cent. of alloy. In making brass sheets the greatest care is necessary in stirring the zinc which, being so much lighter than the copper, has a tendency to float on top, and unless you stir up the copper from the bottom of the crucible you will have several grades of brass when you pour off. This I know from experience. When working at Holdford Mills, Birmingham, England (this is years ago) we experimented with 12 melts without stirring, and there was not one melt out of the 12 that would roll. The reason was the metal would not mix itself. You will find it is so with any kind of composition—the whole must be vigorously stirred to get an intimate mixture.

During the first two months of the present year the exportations of tin from the Federated Malay States amounted to 9,275 tons, as against 7,875 tons during the same period last year, an increase of 1,400 tons.

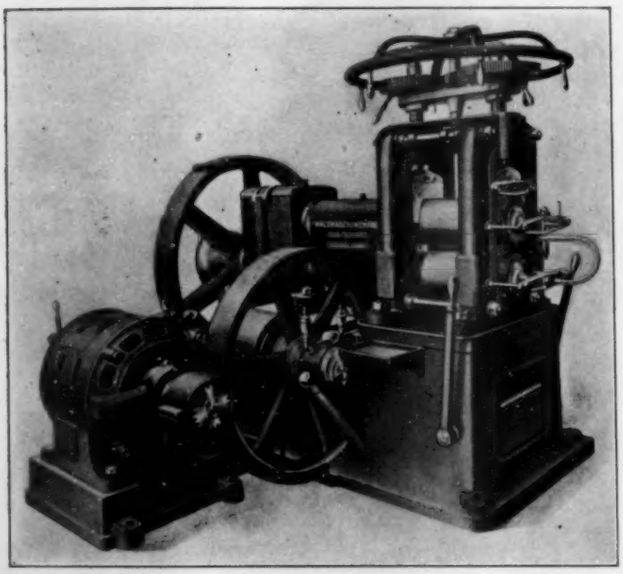
INDUSTRIAL

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

A MODERN COLD ROLLING MILL.

The machine described hereafter is the result of a long practical experience on the part of the builders, and has proved to be a high standard mill since put on the market. It is especially adapted for rolling strips down to the thinnest of gauges, and is therefore indispensable to all brass and copper mills where accuracy and finish are important factors. These machines are built in different sizes of rolls and depending on the width of the strips the mills are either furnished single or double geared.

The annexed cut shows the machine motor driven, whereas it is also built with pulley drive, chain drive, or by means of an underground shafting, according to the local conditions of the shop. For manufacturing



MODERN COLD ROLLING MILL.

smooth and accurate brass and copper strips, chilled iron rolls are entirely abandoned as far as finishing is concerned, and the rolls in this mill consist of one solid block of cast steel, extremely hard and highly polished; the necks of the rolls are also hardened to reduce the friction to a minimum. The rolls are arranged for interior water cooling, which is done by means of flexible joints on the outside of the necks, as the cut shows. The water first passes through the upper roll and is then led to the lower one by a flexible hose.

The bearings for the rolls are held in position by a cross holder and when changing the rolls is necessary this can quickly be done by untightening the bolts, after which the rolls with the bearings can easily be slipped out. The housings consist of steel castings, thus giving perfect guarantee for steadiness and compactness of the mill. Above the rolls an oil tank is placed to supply a constant stream of oil to the bearings, which can be regulated independently. The bearings are made of best phosphor bronze. The rolls can either be regulated independently by two hand levers, as shown, or by means of a combined regulating system. On the extension of the hand wheel shaft a pinion engages two large gears on the pressure spindles, and a steady distance plate keeps the arrangement always in a compact state. Either of these gears can be disengaged through a lever by turning a handle provided for this purpose, which will lift the corresponding gear out of its position. This system of regulating is especially applied where great accuracy of the strips is desired, and on account of its allowing a constant control of the pressure, it is practically indispensable in all cases where the finest brass and copper strips have to be rolled.

The driving mechanism, depending on the size of the mill, is either double or single geared. A spur pinion on the driving shaft transmits the power to the large gear on the pinion housing. The latter one is entirely closed and the pinions run in oil. A cover on the top permits easy access. The transmitting pinions have staggered teeth in order to avoid irregularities on the material to be rolled. The breaking pins are covered by a handsome case to prevent the workmen coming into contact with any revolving parts. All gears are accurately cut and protected with covers. The drive is actuated through a friction coil clutch mounted on the driving shaft. This system has proved to be far superior to any other yet existing on account of its exactness and reliability. Starting and stopping are accomplished by the levers shown in front of the machine.

In case the machine is required to be motor-driven, as shown in the accompanying cut, a special bed plate will be connected to the rolling mill frame to insure absolute alignment. According to the size of the motor this must be specially built to suit the driving proportions. The pinion on the motor shaft is made of raw hide to eliminate as much noise as possible when the machine is placed on the floor.

Belt driven machines are arranged to have the pulley on the shaft, where the second gear is shown, to reduce the floor space occupied. The winding and reeling devices, which are not shown in this cut, will also be supplied with each mill. The coiler is driven by a belt from the pulley of the large gear. The coiling drum is made collapsible and consists of four quarter sections that can be contracted when the coiled strip is to be taken off. The reel can be adjusted to any angle to suit the most advantageous introduction of the material into the mill. It can also be thrown out of position if not required.

In the bed of the frame a tank is placed for catching the waste oil. An outside groove is cast in the bed which serves likewise for catching waste oil and preventing it from soiling the floor.

Each machine is supplied complete in ready working condition. A small receiving table is attached and also a wrench racket. All foundation bolts and wrenches are supplied. The machine shown in the cut is an 8 x 10-inch mill, but, as stated, all kinds of mills are built and on request, but details of the material to be rolled must be given.

These machines are built by Walzmaschinenfabrik August Schmitz, of Dusseldorf, Germany.

THE PARKS PORTABLE MOLDER.

The Parks portable molding machine is strictly automatic in every way. It is the result of extended experiments which demonstrated that certain mechanical principles could be used to advantage in the prep-

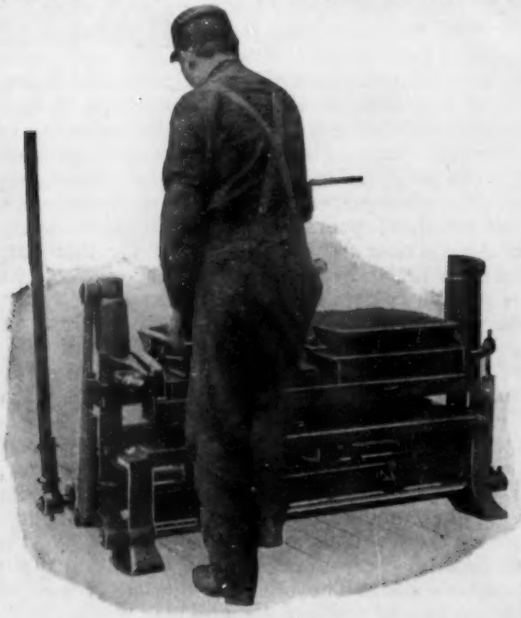


FIG. 1. RAMMING UP THE FLASKS.

aration of a mold. This discovery was simply that of counterbalancing all weight except that of the sand itself and in utilizing the force of gravity for ramming up molds by jarring or jolting the flasks. Since there was but one way of utilizing this principle, the first

FIG. 2. VIEW SHOWING THE ROLLING OVER PROCESS.

machine constructed was a complete success and later machines have been improved only in the refinement of details of construction.

The following description taken in connection with the three engravings herewith presented will make the construction and operation of the machine easily understood. The rock-over table or match plate supports are held at each end in bearings on the piston heads, which are secured to the upper end of the piston rods. These rods are adapted to move up and down in adjustable brass boxes inside of suitably arranged tubing, the bearings being entirely protected from sand and grit. The rocker-arms at the bottom of the frame work are connected on each side of the machine through the pitmen to the piston heads and by means of a foot lever attached to the rocker-arms, the operator causes the pistons with the rock-over table and flasks to move up and down for the purpose of jarring the sand in the flask. The weight of the flask itself and all the moving parts except the sand are center-balanced or suspended by adjustable springs. At each downward stroke the angle irons supporting the match-plate and flask strike against the bumpers, thus jarring or jolting the sand down around the patterns, only a few blows being required to attain the degree of firmness desired. Back-boards are clamped on top of the molds and the latter rolled

FIG. 3. DRAWING OF THE PATTERNS.

over and lowered until these back-boards rest upon the bumpers. The operator then pulls down the hand lever which squeezes the backs of the molds and automatically releases the clamp holding the back-boards and at the same time this operation levels the molds or brings the patterns into perfect line with the back-boards, after which the operator, by raising the hand-lever back to its normal position and at the same time pushing down on the foot-lever draws the patterns perfectly straight from the molds.

While this operation is apparently very simple, the machine would not be practicable without the Parks invention, which consists broadly of counter-balancing all non-essential weight and in utilizing the force of gravity for ramming up the mold. Jarring, jolting or otherwise ramming up the mold by the force of gravity is claimed to be the best means employed for molding from any sort of pattern. It will be apparent, however, even to those who have not had experience with this method that it is only the weight of the body of the sand itself that is effective in packing the sand firmly around the pattern. In other

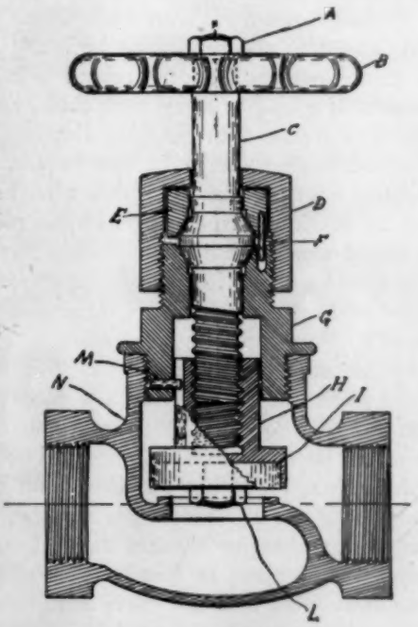
words, a body of sand in a flask, falling a certain distance and striking a light, yet solid blow, will pack or ram itself by the force of gravity more effectively than it a flask were placed in a house and the latter allowed to fall the same distance. While this illustration is a homely one, it serves to show the vast difference in the application or use of the gravity method in this machine.

In making snap flask molds the cope and drag are rammed at the same time, while with ordinary flasks the required number of drags from each pattern is first made, after which the copes for the same are rammed up. The entire operation of completing a perfect cope and drag is accomplished in a few minutes' time without any strain on either the operator or any part of the machine.

This machine is manufactured by the Mitchell-Parks Manufacturing Company, Missouri Trust Building, St. Louis, Mo.

THE NOPACK GLOBE VALVE.

We here present an illustration of a new and distinct type of globe valve, patented in March last and placed upon the market by the Nopack Valve Company, of 2049 North Second street, Philadelphia, Pa. As its name implies, no packing whatever is required, all leakage being prevented by a double-ground joint. The stem, having no vertical movement, forms a perfect ground joint between the bonnet and locknut and will wear as long as the whole valve lasts.



NOPACK GLOBE VALVE.

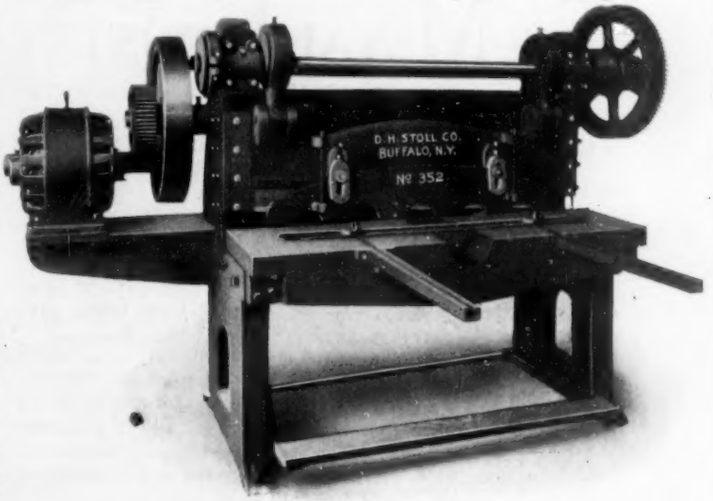
Another important feature is the vertical movement of the valve or disc holder H. This valve is raised and lowered by turning the wheel, but being keyed in position, it has no rotary motion, and, of course, does not cut out the disc like other valves. The discs are not of special design but are interchangeable with other first-class discs. These valves are made of high-grade steam metal and are guaranteed for a working pressure of 150 pounds. The construction will be understood from the accompanying sectional drawing.

THE STOLL POWER SHEARS.

The D. H. Stoll Company, of Buffalo, N. Y., have furnished the following power shears to the Buffalo Copper & Brass Rolling Mill, of Buffalo:

One 11-ft. shear to cut 18 gauge soft steel, weight 5,200 lbs.; two 10-ft. shears to cut 18 gauge soft steel, weight 4,950 lbs.; one 6-ft. shear to cut 14 gauge soft steel, weight 3,400 lbs.; one 52-in. shear to cut ⅛-inch soft steel, weight 4,300 lbs.

These were all furnished with 5 horsepower Westinghouse motors mounted on brackets and geared to the back shaft.



THE STOLL POWER SHEARS.

Two 52-inch shears cut 14 gauge soft steel, and are equipped with 3 horsepower motors. This type of shears weighs 3,100 pounds without the motor.

All of these shears had a small gap in the housings, so that longer sheets could be trimmed, or strips of greater length than the cutting edges, could be cut off up to 2¼ inches wide. Cut gears were used throughout; the pinion on the cutter shaft being made of wrought iron.

These machines are all of the same type, as shown in the engraving, which is the 52-inch for ⅛-inch material.

According to a decision by the Board of General Appraisers, amorphous diamonds, commercially known as black diamonds, carbon, or carbonado, used in the construction of drills for mining and prospecting purposes, and as metal cutting tools, if advanced from their natural condition by cleaving, splitting, cutting, or other process, are dutiable at the rate of 10 per cent. ad valorem, as "diamonds advanced," etc., and are not free of duty as "miners' diamonds not set."

The London Financial Times states that negotiations "are within sight of successful termination" for a proposed convention in the spelter trade. The object of the negotiations is, it states, to effect an arrangement to regulate the production and selling price of spelter in Europe. Parties to the convention are the producers in Silesia, western Germany, Belgium, and Great Britain. It is stated that all the German producers, with the exception of Von Giesch's Erben, are now in accord on the subject of a convention. Von Giesch's Erben is one of the most important producers on the European continent, its annual output amounting to some 30,000 long tons, or one-seventh of the entire production of Germany.

EDITORIAL

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ADVERTISING RATES ON APPLICATION

ENTERED FEBRUARY 10, 1803, AT NEW YORK, N. Y., AS SECOND CLASS MATTER UNDER ACT OF CONGRESS MARCH 3, 1879.

CONTENTS

TO TELL, OR NOT TO TELL.

In an editorial in our issue for May, 1908, we said:

"We must confess that we could never understand why any manufacturer, having discovered a profitable process or method, should be expected to present it to the public. To him it is a cash asset, and he would be just as fair to himself if he donated a portion of his capital to the general public—and in either instance he would be relegated to the foolish class."

This was written in the hope that someone would come after us with a club of large dimensions and advocate the "wide dissemination of knowledge" and the open door. But, since no one appeared to be willing to dance to our fiddling, we are in the same predicament as the man who has to explain his own joke. Of course we left a loophole in the phrase "any manufacturer, having discovered a profitable process or method." Here the main point is concerning who is to be the judge of the profitable qualities of the process; certainly not the man who owns and used the process—he revolves in his own little circle and can see nothing beyond his own little orbit. He is undoubtedly honest in the belief that he really has something of great value and he is not tainted with generosity to the extent of giving it away. Psychology would explain that such a man, with his mind always directed inwardly, who is busiest with self-concentration, finally becomes imbued with the conviction that what he thinks is and must be absolutely true; therefore his methods are of the greatest moment and he must keep them secret—the world would wobble if any one found them out.

Some ten or twelve years ago the American Society of Mechanical Engineers met in convention in Providence, R. I. At one session the members received an invitation to visit an engine plant having a world-wide reputation; that is, all who were not engaged in the engine business would be welcome. It is needless to state that that particular plant was not burdened with visitors of any creed during the convention. It may be said, however, that if all the engine builders in the United States had inspected that plant at that time they would not have come away filled with new ideas as to how a manufacturing establishment should be conducted; there was not the ghost of a secret anywhere in the neighborhood.

At the summer meeting, just closed, of the Institution of Heating and Ventilating Engineers (England), a quite unusual course was followed. According to *The Ironmonger*, of London, the following note was sent out:

"As valuable information is contained in the papers to be read, it has been decided that they shall not be made public, but confined to the members of the Institution by being made copyright. A copy may be had before the meeting, by any member, of either paper on written application to the secretary."

This is an extraordinary statement to emanate from a society which was founded "to promote the science and practice of heating * * * and other kindred subjects, and to give an impulse to invention likely to be useful to the members * * * and to the community at large." Some of the societies in this country protect their proceedings by copyright, but we have yet to hear of one that bars its papers from proper use by the trade press. The Heating and Ventilating Engineers, like some manufacturers, have secrets and they mean to keep them tight locked in their own little congregation of three hundred—we are informed that numbers their membership. But it is too bad to keep palpitating humanity in cruel suspense until they get ready to promote the science and practice of heating. What people in this country want at this time of the year, with the thermometer ranging the nineties, is not a disquisition on heating problems, but on ventilation, preferably according to the circulating method.

During the past twenty years we have visited hundreds of manufacturing plants, big and little, good and bad, clean and dirty, in all parts of the country, and never yet saw a trade secret, or even heard of one, that was large enough to be measured with a micrometer. As actualities they are mighty elusive, but as rumors they are as plenty as Hamlet's fleas. Before having been conducted through a works we have often been pledged to say nothing about the methods or appliances of the concern. After the inspection we would always seek some quiet nook and commune with ourselves. We would search ourselves mentally and physically in the endeavor to find the secret. Not being successful, we would pat ourselves approvingly and breathe a blessing on the man who had made us promise to say nothing about his plant; he had saved us the trouble of writing a story that was not worth the writing.

INCOMPLETE RECORDS OF THE A. B. F. A.

As will be noted in our department devoted to Associations and Societies, the business doings and professional papers of the American Brass Founders' Association will be printed with those of the American Foundrymen's Association, and both will be issued as one series. We presume the expense will be shared pro rata.

This arrangement will benefit both societies, and will be of special value to the members of the Brass Association, since it will place at their disposal the large number of papers read before the Foundrymen. These contributions, taken year in and year out, cover the big subject of foundry practice in the completest way.

We understand the first number under this plan will be issued very shortly and will contain a full report of the Toronto Convention of the Brass Association, and will also have an account of the business meetings held last year in Philadeplhia when the Association was formed.

This is all as it should be, with one exception which we think is very serious. At the Philadelphia meeting four papers were presented on "Science Applied to the Brass Foundry," by Andrew M. Fairlie; "Electro-Deposition of Brass," by Charles H. Proctor; "A Plea for Healthful Conditions in the Brass Industy," by Walter B. Snow, and "Automatic Polishing," by Jonas A. Parker; they will be omitted from the permanent record of the Association. These papers can only be obtained now in pamphlet form of a size not suitable for binding with or insertion in the transactions as they will be printed. If these papers are to be thrown out because they are not worth the small cost of their preservation in the printed proceedings, then the committee having this matter in charge has made no error of judgment.

THE BRITISH HALL MARK—A FRENCH APPLICATION.

The Birmingham Jewelers' Association has in recent years registered several applications to escape the stringency of its Hall Marks. The effort on the part of Switzerland a short time ago will still be remembered. Latterly, the French Government have submitted to the Foreign Office a request that the French mark of quality applicable to gold and silver wares be recognized in Great Britain, and carry with it exemption from the necessity of submitting on importation to British assay and hall marking. The reasons assigned by France are the inconvenience and expense of sending jewelry over in a semi-finished condition and the disfiguring of articles by excessive marks when both French and English have to be included. The proposal has come through the Board of Trade to the various assay authorities, Jewelers' Associations, and Chambers of Commerce. It has met everywhere with uncompromising opposition mainly on the ground that the French test is much less severe than the British test. In Great Britain any articles which fall short of the required standard by the merest fraction of excessive alloys are rejected and broken, while in France it is customary to allow a "remedy" of three one-thousandths below standard quality, and as long as the excess of alloy is not greater than that, the mark of quality is applied. Among British jewelers this difference is regarded as vital. There is dissatisfaction, also, with the method of assaying in France by means of the ancient "touchstone," which consists in the filing off by means of the stone, of a small streak of metal, which is compared with standard metal, and tested by acid. It is complained that this can only be approximate. Another difference is that in France only occasional links or parts are marked, whereas in this country every part is marked.

Still stronger objection is taken with regard to silver plate in respect of which a lower quality wil pass the test. In fact, the French standard, consisting of 800 parts of fine silver per thousand, is an illegal quality in this country, and to recognize the French mark would, therefore, open the British market to silver now excluded. In view of the existing difficulty of avoiding fraud the trade are determined not to open the door to further abuse.

In the representations made to the Board of Trade it is pointed out that the compulsory marking in the United Kingdom only applies to what is technically known as gold and silver "plate," outside of which there is a vast variety of articles such as gold chains, finger rings (except wedding rings), brooches, pendants, scarf pins and earrings, and French makers can send these goods to the United Kingdom without submitting them to British assay. The question has been taken up very strongly by the Birmingham Association, which alone comprises 382 firms, and represents quite 60,000 employees.

CRITICISM AND COMMENT

WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES PUBLISHED IN THE METAL INDUSTRY. SUGGESTIONS WELCOME.

SLUSH MOLDS.

To the Editor of THE METAL INDUSTRY:

In your issue of March, 1908, I note a criticism of my article on "Slush Molds," published in the December, 1907, issue, by Mr. John Honan. As you are no doubt aware, I am always pleased to have anyone comment upon my writings; it makes THE METAL INDUSTRY more interesting to me to see such comments.

Mr. Honan states that it is impossible to get good slush castings with 12½ per cent. of antimony. I would say in answer that one of the largest producers of casting metal in the world is of the opinion that antimony and lead composition containing not more than 13 per cent. of antimony gives far better results than a composition containing a larger percentage. Often in their experience, when the metal does not run sharp and clear they advise adding from 1 to 2 pounds of lead to the hundred pounds of their casting metal.

I have proved the value of this statement in my own experience in large plain castings, such as pillars that weigh 5 pounds each and are sometimes 2 feet long. A metal containing too much antimony runs away too freely in the slushing, even when the mold is maintained sufficiently cool. In such cases I have reduced the mixture as low as 11 per cent. and have produced excellent results. In the production of small, solid castings, such as the ash tray illustrated in Mr. Honan's article, I would never think of using more than 13 per cent. antimony, if the heat of the metal is correct and is sufficiently clean. Sharp and clear castings can be produced that will show even the minutest details of the mold.

I do agree with Mr. Honan in his statement that it is not necessary to vent molds if properly made by the mold maker. The right angle is absolutely necessary when casting for successful results, but even this will not prevent air shots or semi-porous holes in the castings. This is due to the numerous angles and curves in many kinds of molds, where it is impossible to exclude the air, or cause it to come forth through the gate when pouring; therefore air vents are essential to allow the air to escape.

In my experience the gates of a mold are of the utmost importance, both in slush and solid castings. In long, straight slush castings it is necessary to pour them on a level, and to do this it is sometimes necessary to have angle gates so that in pouring the highest point of the gate will be exactly opposite the center of the mold. In this manner the air is able to escape as the mold fills with metal.

An important feature in casting is to have the metal clean and as free from arsenic as possible. Of the many methods used in cleaning that I have tried, none have been so successful as adding coal ashes, as it is well known that all ashes produced by combustion contain more or less potash. I have found that the arsenic in the metal combines with the potash in the ashes to a certain extent, giving a cleaner and brighter metal that will run sharp and clear. My casters cover their metal every night with ashes for this purpose.

CHARLES H. PROCTOR.

Arlington, N. J., July 6, 1908.

NEW BOOKS

The Copper Handbook; A Manual of the Copper Industry of the World. Volume VII. 1228 pages. Price, $5. Compiled and published by Horace J. Stevens, Houghton, Mich.

The new edition of this book is materially larger than the preceding ones, as it contains about 180,000 words of new matter. It contains 25 chapters, an increase of nine, treating of copper under the headings of History, Geology, Chemistry Mineralogy, Mining, Milling, Concentrating, Hydrometallurgy, Pyrometallurgy, Electrometallurgy, Alloys, Brands, rades, Uses, Substitutes, Terminology, Geography, Copper Deposits, Copper Mines and Statistics. The treatment given the subject in 1,228 pages is encyclopaedic in scope, but the logical and orderly arrangement of the great mass of facts presented, coupled with a table of contents, full index and alphabetical arrangement of districts, countries, mines, minerals and glossary render it possible to ascertain any given fact with almost as much ease as a word is found in a dictionary. This is a point of much value to readers that has been overlooked in many otherwise excellent works of reference.

In whatever light the Copper Handbook is viewed, whether in describing the thousands of different copper mines, in all parts of the world, in the plain descriptions of intricate processes of mining, milling, smelting and refining, or in the forty pages of statistics covering the copper industry of the globe in its various commercial and financial aspects, the book must stand a monument of patience and labor, it being the unaided work of a single man.

The book will be found of deep interest and practical value to every man interested in the subject of copper, from whatever standpoint, whether he be engaged in the production or use of the metal, or is an investor in copper shares. The descriptions of the mines are written without fear or favor, and several hundred mining companies, some very prominent, are handled wtihout gloves, and in a manner that would justify no end of libel suits were the author not sure of his facts.

"Klondyke at Home," is the title of a book prepared by James Allen, 2453½ Folsom street, Los Angeles, Cal., containing formulas intended for the brass founder, the machinist, the engineer and particularly the electrician. All the formulas are figured out, and there are instructions as to melting, mixing, fluxing, molding and pouring, and the book is a ready reckoner.

Last year Germany produced 32,473 metric tons of copper, 5,864 metric tons of tin, 142,571 tons of lead, 208,195 tons of spelter, 386,933 kilograms of silver and 4,682 kilograms of gold.

CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER QUESTIONS RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

METALLURGICAL.

Q.—Please give me a standard or reliable mixture for steam valves:

A.—The United States Navy standard for steam metal is:

Copper	88
Tin	10
Zinc	2

The British Admiralty standard is:

Copper	87
Tin	8
Zinc	5

A reliable mixture which is easier to machine than the above is composed of:

Copper	14
Tin	1
Lead	¼
Zinc	⅞

In using up steam metal turnings it is a good plan to melt up some heavy scrap, such as gates, etc., and form a bath into which the turnings can be fed. Salt is a good flux. The dirt and skimmings should be put through a fine riddle. The small pieces of brass are then removed for remelting and the fine dust is saved for sale. If put through a washing machine the fine copper dust floats off and is lost. J. L. J.

Q.—(1) We want a metal to back up a copper mold which will have the same equivalent shrinkage as copper, so that there will be no tension between the two in heating and cooling. This would have to stand a temperature of about 800 degrees at least and we would prefer something which would melt at about this point so that it would not require excessive heating to melt. (2) We would also like the analysis of Parson's white brass No. 2 double.

A.—(1) We regret to inform you you are asking for something which does not exist. There is no metal that has an equivalent shrinkage with copper and a melting point of 800 degrees F. The following plan is suggested for consideration: Make a pattern of solid cast copper slightly larger than your ⅛-inch thickness copper mold and from this you may pour any number of solid copper backs after the manner described on page 506 of Peter's Modern Copper Smelting (price $5). These copper backs should be of such size that your ⅛-inch thickness copper molds will fit snugly into them and you can of course have them any weight you wish. Cover the back of the mold with a very thin foil of silver solder; place your copper back on this and heat in a muffle to 1,200 degrees F., or a red heat which will melt the silver solder and solder the two copper parts together. (2) Parson's white brass No. 2 double contains tin 62, copper 4 and zinc 34.—J. L. J.

Q.—We are reading your publication and have received quite a number of good suggestions from it. We are manufacturing a revolving self-heating flat iron, but are greatly troubled by not getting smooth castings, same having many imperfections which no grinding can remedy and much plugging is too expensive.

A.—Your iron is probably not fluid enough when melted and of too open a grain. By using No. 2 foundry iron and ⅓ machinery scrap a close grain will be obtained. Fluidity may be had by adding about 10 per cent. Mannie charcoal softener. Your flat irons should be cast with skim gates and the side that is to be polished in the drag.—J. L. J.

Q.—We are having trouble with our globe valve cores, and in many of our castings we use flour sand cores, which blow readily, but in the globe valve cores the flour sand is not stiff enough to keep the cores from sagging in the mold. Oil sand does not blow out clean.

A.—Instead of flour sand use a mixture of equal parts of lake sand and molding sand, adding one part of molasses to every twenty of sand.—J. L. J.

Q.—What do you recommend to put in melted brass so that the castings will not come porous? We do not think phosphorous is the best thing; it seems to make the castings weak and helps to burn the core sand into the metal. We have a great deal of trouble with spongy castings, blow holes, etc., not being able to pass our testing pumps at 125 to 175 pounds pressure.

A.—Your trouble is probably due to aluminum which is nearly always used in refining remelted spelter. No deoxidizer can make old scrap brass equal to new metal, as the melted metal from the scrap will retain more or less oxides and dross. The least harmful deoxidizer is probably 10 per cent. silicon-copper. If your scrap brass is very light melt some heavy scrap to form a bath and then feed the light material into it.—J. L. J.

Q.—Can you tell me how to make copper castings for electrical work, whether to make in dry sand molds, etc.?

A.—Green sand molds may be used for copper castings, but the sand should be worked as dry as possible. As the metal has a high shrinkage the molds should not be rammed too hard where there are green sand cores. A mixture of 99½ pounds best electrolytic or lake ingot copper and ½ pound of aluminum will give a good electrical conductivity and sound castings if the copper is melted quick and hot. Do not soak in fire; add the aluminum after pulling from the furnace.—J. L. J.

MECHANICAL

Q.—Having heard there is a solution that will sharpen files by immersion, would like to know what it is.

A.—The solution for sharpening files is diluted sulphuric acid. Allow the files to lay in it until they are eaten sharp. Then rinse thoroughly with cold water.—E. W.

Q.—Can you give me a receipt for fastening small brass fittings to glass?

A.—Melt 75 parts resin, 15 parts wax, add 1 part calcined plaster and 15 parts burnt ochre. For use, apply warm.—E. W.

CHEMICAL

Q.—Would like you to give us a 14-K gold solution for flash plating on solid gold rings and watch cases, something that is bright and not too red.

A.—For 14-K flash gilding on solid gold articles, prepare a solution as follows: 10 pennyweights pure gold converted to chloride or 25 pennyweights of commercially pure chloride of gold; 10 ounces c. p. cyanide, and 3 gallons of water. Use 14-K anodes and use at a boiling temperature. If a redder tone is desired prepare a solution of copper as follows and add a little to the gold solution:

Carbonate of copper	½	oz.
Water ammonia	¼	"
Cyanide of potassium	1	"
Water	1	pint

Imitation gold deposits are produced by oreide metal; this comes in the red and yellow metal. This is dissolved in nitric acid and precipitated as a carbonate or cyanide of the metal, and then taken up with cyanide of potassium and bisulphite of soda. A very weak solution is used at a boiling temperature. Good imitations of gold are thus produced.—C. P.

Q.—(1) I would like to get a formula for the finish of the enclosed pull, and how to get it a little lighter or a little darker. (2) We plate a large amount of nickel steel 4 feet long and about 3 inches wide. We would like a formula for a preservative to keep the polish and prevent rusting.

A.—(1) To produce the color same as sample, copper plate in the usual manner, then produce a dead finish by scratch brushing the surface wet, using a little pumice stone applied to the brush. Use a little sal soda in the brush water. Then immerse the articles in a solution consisting of one teaspoonful of hydrosulphuret of ammonia in one gallon of cold water; one or two seconds' immersion will be all that is necessary. Scratch brush lightly without using pumice stone, but keep the surface moist. Then dry out and lacquer by dipping in the usual manner. (2) There is nothing better than a little boiled linseed oil applied to the surface; or lay the finished product in boxes and sprinkle precipitated carbonate of lime over it. This keeps away the moisture and when wiped clean with a soft cloth increases the lustre of the polished surface.—C. P.

Q.—We are manufacturing all kinds of tools, a great many of which are sold with a black finish, and we understand that some manufacturers are using a black dip, that must be heated to a boiling point and the tools dipped in for two or three minutes, and when they are taken out have a soft black finish. The process must be inexpensive.

A.—The following formula is being used for producing a black non-oxidizable surface upon iron and steel tools:

Chloride of bismuth	1	oz.
Bichloride of mercury	2	"
Chloride of copper	1	"
Muriatic acid	6	"
Denatured alcohol	5	"
Water	1	gal.

Use the solution quite warm. The dipping method can be pursued if a deeper black is desired. By boiling the articles in plain water for a short time the results are somewhat improved.—C. P.

Q.—We have made up a gold solution which we took from THE METAL INDUSTRY. This solution being used hot naturally evaporates; we replenish this with the wash. What we want to know is how to keep it in good working order. Please advise us if we should add to this old solution enough of new solution, with all the ingredients in proportion, to bring it up to the original quantity. To make a simple question we have made up this solution, but do not know how to keep it up after it has run down.

A.—The solution referred to can be maintained in permanent use by adding occasionally chloride of gold, as the bath requires it to maintain a good color. In adding cyanide prepare a concentrated solution of cyanide in warm water, then add a teaspoonful or more according to the size of your bath. It is not necessary to add the phosphate and bisulphate of soda in quantities. When the solution deposits dullish gold a pennyweight or two of bisulphite of soda will bring up the color.—C. P.

Q.—I wish to copper plate some leaves and flowers. I would like to dip these in a metallic solution instead of covering them with plumbago before copper plating. Kindly inform me if this can be done.

A.—The method that is now being used to metallize flowers, lace and other delicate objects previous to electro plating consists in coating the surface with an alcoholic solution of nitrate of silver in the following proportion:

Denatured alcohol	12 ozs.
Nitrate of silver	1 oz.

This should be used slightly warm. Now dip, spray or brush the articles to be plated with this solution, then allow to dry at the normal temperature. Now prepare a solution of phosphorus in bisulphide of carbon in the proportion of 1 ounce yellow phosphorus and 12 ounces of the bisulphide of carbon. Now proceed as before by coating the silvered surface by dipping, spraying or brushing. The metallic silver is thereby reduced and as soon as dry the objects are ready for immersion in the copper bath. They may afterward be finished in silver, gold or any other color desired.—C. P.

Q.—Can you give me a formula for coating small pieces of steel work with zinc by the immersion process; I believe this is being done in the United States.

A.—For coating small articles of steel with zinc by the contact process proceed as follows: Prepare a concentrated solution of equal parts of chloride of zinc and sal ammoniac in boiling water. Place the cleansed articles on a perforated piece of sheet zinc and in a short time they will be sufficiently coated.—C. P.

Q.—In your issue of April, 1906, you give an article called "Galvanizing Solution" and for the anodes you speak of equal parts of antimonial lead and common zinc. We have tried to get some of this lead and are told that much depends upon what quantity of antimony should be used, that is, what proportion of antimony and lead.

A.—In the article on galvanizing that you refer to the anodes of antimonial lead should consist of 10 parts antimony and 90 parts lead. One anode of this composition to 2 of zinc should be used.—C. P.

Q.—I have a silver bath, 170 gallons. My firm want me to get 9 dwts. of silver on a medium-sized coffee pot. I find I am unable to do it without running them from 2 to 2½ hours. I use 6 anodes, 7 by 11 inches, three on each side. My current is 14 amperes. The solution stands 30 Baume with 2¼ ounces silver to the gallon.

A.—You are evidently carrying too much free cyanide in your bath; with only 2¼ ounces of silver to the gallon the solution should not stand over 15 Baume. To increase the deposit it would be advisable to add at least ¾ to 1¼ ounces more silver to the gallon, either in the form of chloride or cyanide of silver. Do not add any more cyanide. When you make the addition of silver it would also be advisable to increase the anode surface. You are no doubt constantly robbing your solution of its silver on account of the deficiency of anode surface.—C. P.

Q.—We are experimenting with a solution for electro-tinning insides of copper cans. We have used the following: 35¼ ounces carbonate of potassium, 3 5-10 ounces cyanide potassium and 14.11 drams chloride of tin. We have been unable to get more than a blush of deposit which would brush off easily.

A.—Try the following formula for your purpose:

Water	1 gal.
Cream of tartar	4 ozs.
Chloride of tin	½ to 1 oz.

Use the solution nearly boiling, or not less than 160 degrees. Use anodes of pure tin. This bath will give a good heavy deposit of tin in a few minutes. In the formula you give you do not state the number of the gallons of water; if you use the proportions mentioned in 1 gallon of water you will never get results. Weak solutions of tin are best for electro deposits. The proportions given by you are sufficient for at least 10 gallons of solution.—C. P.

Q.—Kindly inform me to what use the salts that accumulate in a bright dipping acid can be put to.

A.—The salt that crystallizes out from a bright dipping acid contains sulphate of copper and sulphate of zinc. These can be washed with cold water and then redissolved in hot water and precipitated with carbonate of soda to produce carbonate of copper and zinc. The latter can be used in strengthening brass or bronze baths in the usual manner.—C. P.

Q.—In making nickel electrotypes, what means are adopted for starting the deposit?

A.—The usual method is black leading; then immersion in a sulphate of copper solution in shallow trays and sprinkling with very fine iron filings; afterward give at least 1 hour deposit in the regular copper bath and finish in the nickel bath. The sprinkling of iron filings upon the surface of the black lead starts an immediate deposit of copper and aids in producing a more rapid deposit.—C. P.

Q.—I would like to know of a good receipt for a dip that will produce a sand blast finish on iron and brass. I have several odd jobs occasionally in builders' hardware (repair work) that call for this finish, such as old oxidized copper and antique brass, etc.

A.—A satin finish cannot be produced upon iron without the sand blast. Brass can be satined by adding sulphate of zinc to a mixture of 1 part nitric acid and 2 parts oil of vitriol, with 1 or 2 ounces of muriatic acid added to each gallon of mixed acids. The best method for you to pursue would be to plate your articles in the regular manner, then scratch brush them, using water and pumice stone to produce a dead finish. Now oxidize the articles and brush lightly without pumice stone. Afterward relieve in the usual manner, but use the scratch brush and a little pumice stone in place of the buff or felt wheel. This produces the dead effect upon the copper or brass and gives the sand blast effect.—C. P.

Q.—I want a rose gold solution on solid gold. Also a formula for taking off green o nsolid gold (or fire) in preparing for plating. Also a formula for a good Roman on solid gold.

A.—An excellent Roman gold on solid work can be obtained with the following formula:

Fine gold	6 dwts.
C. P. cyanide	4 ozs.
Yellow prussiate of potash	2 dwts.
Phosphate of soda	2 "
Sulphate of soda	2 "
Carbonate of soda	2 ozs.
Water	1 gal.

Use fine gold anodes and a hot solution. For rose gold the same formula may be used. Then prepare a solution consisting of the following:

Yellow prussiate of potash	8 ozs.
Acetate of copper	4 "
Water	1 qrt.

Mix thoroughly and add sufficient to produce a shade of rose. It is best to use a karat anode alloyed with copper, 18 parts fine gold to 6 parts copper. For removing the green from gold use the following formula:

Carbonate of copper	2 ozs.
Carbonate of soda	4 "
Water	4 "
Water	1 gal.

Then add cyanide of potassium until 15 Baume is reached. This should be arranged the same as a regular plating bath only with the poles reversed. Cathodes of sheet copper should be used and should completely surround the small tank or jar used. The articles should be placed upon the center pole; with a strong current the green is removed quickly, the work being left bright.—C. P.

Q.—We send you a sample wooden ball which we desire to plate. This is a very low priced article which we intend to finish in large quantities; we cannot devote much time and labor to it, and therefore believe a dip solution would be best for the first coat.

A.—There are two methods which may be employed in producing an electro deposit upon wood. The first is to coat the wooden balls with amyl acetate collodion (6 or 8 ounces to the gallon), by dipping in the same way as lacquering, and when thoroughly dry immerse in a solution consisting of nitrate of silver 1 ounce, denatured alcohol 10 to 12 ounces. Allow to dry. Then immerse in a solution of yellow phosphorus in bisulphide of carbon (1 ounce of phosphorus to 12 ounces of the bisulphide of carbon). By this process a coating of metallic silver is produced upon the surface which may afterward be coated with copper in the usual copper acid and then finished in any finish desired. The second method consists in coating the surface as mentioned and when dry immerse in a dilute varnish thinned with turpentine so that it is only slightly tacky. Allow to dry a little, then cover them entirely with copper bronze powder. When dry brush off the surplus powder with a soft brush and proceed in the same manner as above. This may give you the better result of the two.—C. P.

METALLURGICAL DIGEST

A REVIEW OF METALLURGICAL MATTERS OF THE WORLD.

TRANSLATED AND EDITED BY IRVING LANGMUIR, MET. E., Ph.D.

FURTHER STUDY OF BINARY ALLOYS.

N. A. Pushin (Journal Russian Phys-Chem. Soc. 39, 1907; abstract in Chemical Abstracts, vol. 2, page 58-64) has shown in a series of articles that the measurement of an electromotive force can be made the basis of an investigation into the constitution of binary alloys in much the same way as the cooling curves. An electrolytic cell is constructed in which one electrode is made of the alloy to be investigated, the other electrode is made of the less noble of the two metals composing the alloy, while the electrolyte is a solution of a salt of this less noble metal. The manner in which the electro-motive force of such a cell changes when the composition of the alloy is made to change, serves to show the constitution of the alloy. The author has investigated the alloys from over sixty pairs of metals. Some of his results on the most important of the alloys may be of interest.

Alloys of zinc and copper: The author concludes that there are four compounds formed—Zn_3 Cu (14.7% copper), Zn_2 Cu (32.7% copper), Zn Cu (49.2% copper), and Zn Cu_3 (66.1% copper).

Alloys of zinc and silver: These alloys are analogous to those of zinc and copper. Up to about 41% of silver they are crystalline, have the color of zinc, are coarse grained and very brittle. Their hardness gradually increases with the percentage of silver, reaching a maximum at 45% silver. Further addition of silver makes the alloy brittle; the hardness then begins to increase, reaching a second maximum at about 62.5% silver. The alloy with 52% silver has a white shining appearance; on standing in the air its surface assumes a bright rose color. With 74% of silver the alloy on prolonged exposure to the air assumes a bright yellow color on the surface. This alloy and all those with still more silver are tenacious and malleable. Four compounds are indicated. The close analogy in composition between the brasses and the silver-zinc alloys suggests a similarity in mechanical properties which would make the latter as valuable for technical and domestic purposes as the former except in the matter of expense.

Alloys of Lead and Arsenic: Alloys containing up to 6% of arsenic are soft, but those containing about 13% of arsenic are hard and brittle and exhibit a distinct crystalline structure. There is no evidence of the formation of compounds.

Alloys of tin with metals of the iron group: 1st. Tin-nickel: By addition of small quantities of nickel to tin or of tin to nickel the hardness of either metal is considerably increased.

2. Alloys of tin and manganese are white and soft when there is not over 20% of manganese. With more manganese they are brittle.

3. Tin-iron alloys are relatively soft except those with large percentages of iron.

4. Tin-chronium alloys are very soft and resemble tin. Only those very high in chromium (80% or more) are hard.

FERRO-BRONZES.

A series of three articles have appeared in the *Metall-Technik* (Feb. and Mar., 1908) on ferro-bronzes or alloys containing 55-62% of copper and 38-45% of zinc with small amounts of iron, usually less than 1 or 1.5%. In Germany these alloys are made by the Durener Metallwerke and sold under the name of Durana-metal. In England and America ferro-bronzes are known under the name of Delta-metal, Aich's Metal and "Sterro-metal."

The most serious difficulty in the manufacture and treatment of these alloys is in obtaining a uniform distribution of the iron throughout the metal and in preventing its oxidation. Durana-metal is said to be made by a secret process, which overcomes these difficulties. There are some seven grades of the metal on the market, which fulfill many different needs of the industry. It will be recalled that the most valuable features of ferro-bronzes are great strength, toughness, and resistance to corrosion. The alloy can be cast, forged, stamped and rolled hot and drawn cold. The addition of aluminum or manganese or both up to 3% often lends valuable properties to the alloy. The *Metall-Technik* gives some interesting figures on the strength of various samples of Durana-metal, showing also the effect of mechanical treatment. The most noteworthy results are given in the following table:

	Elastic limit. Lbs. per sq. in.	Ultimate tensile strength.	Elongation. Per cent.	Contraction. Per cent.
"Alloy M. L." annealed soft rods...	17,000	54,000	40.	62.
Ditto, hard	78,000	85,000	10.	55.

SOLDERING COMPOUNDS.

A rather thorough research into the relative values of different soldering compounds or fluxes has been made by Adolf Lippmann (Electrotechnische Zeitschrift, 1907, page 856). In Germany there has been a strong prejudice against the use of any soldering mixtures containing free acid. The author attempts to show that soldering with acid mixtures is perfectly satisfactory and that with reasonable care to wash off the excess of acid after soldering the danger of corrosion setting in around the joint may be neglected. A good joint is much more readily obtained with an acid mixture such as a solution of zinc chloride or a solution of hydrochloric acid than with colophony (common rosin). However, there are some soldering compounds which are free from acid and yet allow the soldering to take place as readily as with the acid mixtures, and naturally these are somewhat to be preferred.

Many experiments were made to determine the degree of acidity of various soldering compounds and the extent to which they attacked the metal. The compounds or fluxes considered were colophony, zinc chloride and several preparations which are on the German market, Tinol, Fludor and Lötan. Tinol is principally a mixture of glycerine, sal ammoniac and finely powdered solder. The composition of Fludor and Lötan is not given. The author finds that colophony contains a very high percentage of organic acids. Fludor contains about 1/7 as much, while Tinol contains practically none.

Interesting tests of the efficiency of various soldering compounds were made. For this purpose a brass rod was soldered into a hole in a larger brass rod, the end of the smaller rod, however, being kept free from solder. The force necessary to pull the rod out of the hole was measured. In this way the shearing strength of the joint was determined, and by comparing this with the shearing strength of the solder itself the "efficiency" of the joint was obtained.

As the average of many tests the following results were obtained for the efficiency of joints made with the use of various soldering compounds:

Zinc chloride, 80%; Fludor, 79%;
Tinol, 79%; Lötan, 76%; Colophony, 64%.

The author sees no reason why colophony should ever be given the preference among soldering compounds.

Albert Lamy, of Karlsruhe, Germany, has taken out a German patent (No. 186,910), on a process of oxidizing and enameling or coloring aluminum objects by the action of acids and alkalies, in which oxidation of the metal permits the combination with potash lye or similar substances, whereby the surface may be colored by the use of lakes or certain aniline or alizarine compounds which yield colored precipitates upon oxidation.

PROTECTING MIRRORS ELECTROLYTICALLY.

An article in the Metall-Technik (Nov. 23, 1907, page 371) describes a new method of preparing a protective coating for mirrors by means of electrolysis. The principal difficulty in depositing copper on a thin film of silver obtained on glass by chemical means is in overcoming the tendency of the silver film to peel off the glass in the neighborhood of the places where the electric contact is made.

The new process, which was found by Martial Freyberg, consists in roughening a narrow strip along the edges of the glass plate by grinding, sand-blasting or etching with hydrofluoric acid. The silver film is then chemically deposited on the glass and the copper is electroplated on to the silver, the electric contact being made along the roughened edge. In this way the silver is made to adhere so firmly to the glass that even with considerable current densities there is no tendency for it to separate from the glass. The process has been patented in Germany.

TUNGSTEN AND TANTALUM.

The metals tungsten and tantalum, which a few years ago could hardly be produced in a state of purity at any cost, are now being made in considerable quantities, more especially by the firm of Siemens-Halske, of Berlin. Probably the most important application of these metals will be as filaments for incandescent lamps, but tantalum has many properties which will render it exceedingly useful. Its great hardness and toughness are scarcely exceeded by any other metal.

The manufacture of these two metals has only become a commercial possibility through the invention of electric furnaces by which the metals could be melted in a vacuum. The ordinary electric furnace cannot be used, because the metal would be contaminated with the carbon of the furnace. Furthermore, air must be carefully excluded, for not only the oxygen, but also the nitrogen of the air, reacts with these metals at such high temperatures.

H. von Wattemberg, by using a new type of electric furnace, recently succeeded in making an accurate determination of the melting point of tungsten by means of the Vanner optical pyrometer. He found the melting point to lie between 2800° and 2850° c. (or between 5072° and 5162° F.). Probably no other known substance except carbon has such a high melting point.

An alloy consisting of 49.5% of nickel, 49.5% of aluminum, and 1% of phosphorus, is said by F. J. Schumacher, of Stuttgart, Germany (German Patent No. 190,234), to be suitable for coating acid containers and to afford better protection to the vessel than lead.

"TINOL" AND "FLUDOR."

The article on soldering compounds, by A. Lippmann, which was published in the *Electrotecknische Zeitschrift* and which was recently reviewed in these columns, has been the subject of much discussion and criticism in Germany. It is claimed that the value of a soldering compound depends upon other factors besides those cited by Lippmann and that the first step in an investigation of relative merits of different compounds should be a chemical analysis. Dr. Emil Hohler, in a recent number of the *Electrotechnische Zeitschrift*, April 2nd, 1908, page 366, makes a very thorough comparison of the two soldering compounds "Fludor" and "Tinol." A few of his results will be given here:

Tinol (made by Küpper's Metallwerke) consists of—

7.9% glycerin.
3.1% ammonium chloride (salammoniac).
88.9% metallic powder.

The metallic powder contains equal parts of tin and lead, having, therefore, the composition of a soft solder.

Fludor is a pasty substance made by Classen & Co. It is used as a flux and it contains no metal. An analysis gave—

34.0% of zinc chloride
10.5% of organic acids

The zinc chloride is apparently made up to a paste with a substance of the consistency of vaseline and which melts in hot water. The organic acid seems to be commercial stearic acid.

Dr. Hohler considers in great detail the relative merits of these two substances and as a result concludes that Tinol is preferable in that it is much less liable to cause corrosion of the metal around the soldered joint.

NON-CORROSIVE QUALITIES OF ALUMINUM.

The employment of aluminum for the construction of tools and apparatus subjected to the action of acids is finding great favor in Germany. In chemical works it is being used as a substitute for porcelain and copper in sieves, stirring apparatus, etc. The "Electrotechnischen Zeitschrift" cites the results of tests extending over two years in arsenals at Siegburg. Here aluminum has been found to resist the action of sulphuric and nitric acids—concentrated or diluted—very much better than copper. Perhaps the most severe test was in the nitroglycerin plant where mixtures of concentrated nitric and sulphuric acids are warmed in aluminum vessels. Even in this case the aluminum was so little corroded in two years time that the vessels will last years longer, whereas according to previous experience it would have been necessary to replace vessels of copper, brass, or bronze several times during this period. For tools such as tongs, ladels, etc., the aluminum has the additional advantage of lightness.

Associations and Societies

REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS.

AMERICAN BRASS FOUNDERS' ASSOCIATION.—President Charles J. Caley, New Britain, Conn.; secretary, W. M. Corse, 54 Lathrop avenue, Detroit, Mich.; treasurer, John H. Sheeler, Philadelphia, Pa. The object of the association is purely educational, and is accomplished by the collection of such information as will be of benefit to the members and to general shop practice, by the presentation of papers on appropriate subjects, and by the publication of such literature.

We have received the following communication from the secretary:

Regarding the transactions this year, they will be published in conjunction with the American Foundrymen's Association, and will be the same size and type as theirs. Our members will receive the A. F. A. transactions along with their own, so that the volume will probably consist of several hundred pages and will be a valuable addition to any foundryman's library. These transactions will not be issued all at one time but will be sent out as fast as they can be gotten ready. They will be paged so that they can be bound nicely and will make a neat volume.

This publication will contain the proceedings of the Toronto meeting but will not go back further than that. I have a few copies of the proceedings of the Philadelphia meeting without the papers which I shall be glad to furnish anyone who wishes them.

NEW CONSTITUTION OF THE AMERICAN BRASS FOUNDERS' ASSOCIATION.

ARTICLE I. NAME AND OBJECT.

Section 1. The name of this Association shall be The American Brass Founders' Association.

Section 2. The object of this Association shall be the advancing and dissemination of knowledge concerning the Arts connected with the producing, founding, working, and finishing of the non-ferrous metals and their alloys. This shall be accomplished by the interchange of experiences and opinions

among the members of the Association by the presentation of papers upon appropriate subjects at periodical meetings of the Association, by the publication and distribution of such literature as may be deemed expedient and by such other means as the Executive Board may direct.

ARTICLE 2. MEMBERSHIP.

Section 1. The membership of the Association shall consist of two classes, to be called, respectively, active and honorary members.

Section 2. Active Members:—Any firm, corporation, or individual producing, founding, working or finishing non-ferrous metals or their alloys, or managers, superintendents, foremen and skilled employes thereof.

Manufacturers or dealers in supplies used by members of this Association.

Section 3. Honorary Members:—Any person whose knowledge or services are pre-eminently valuable to the Association.

ARTICLE 3. OFFICERS.

Section 1. The officers of this Association shall be a President, ten Vice-Presidents, a Secretary, and a Treasurer. These officers collectively shall constitute the Executive Board of the Association.

Section 2. The ten Vice-Presidents shall be selected from their respective districts as follows:

(a) Two for the New England States.
(b) New York and New Jersey.
(c) Pennsylvania, Delaware, Maryland, District of Columbia.
(d) Michigan, Ohio, Indiana.
(e) Illinois (except City of Chicago), Missouri, Kansas, Colorado, New Mexico, Utica, Arizona, Nevada, California.
(f) City of Chicago, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Idaho, Nebraska, Montana, Wyoming, Washington, Oregon.
(g) Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas, Kentucky, Tennessee, Indian Territory.
(h) Quebec and the Maritime Provinces.
(l) Ontario and the Western Provinces.

The Vice-Presidents shall elect one of their number Senior Vice-President.

ARTICLE 4. CONVENTIONS.

Section 1. This Association shall meet in convention each year at the time and place that the Annual Convention of the American Foundrymen's Association is held.

Section 2. During the Conventions, meetings shall be held for the transaction of business, and for the purpose described in Section 2 of Article 1.

Section 3. Twenty-five members shall constitute a quorum.

ARTICLE 5. AMENDMENTS.

Section 1. This constitution may be amended at any regular meeting of the Association by two-thirds vote of the members in good standing present. In case a quorum be not present the Secretary shall within thirty days of adjournment submit the proposed amendment to the Members for ballot by mail.

Section 2. Any proposed amendment endorsed at any time by a majority of the Executive Board shall be submitted by the Secretary to the Members for ballot by mail.

BY-LAWS.

Section 1. The officers of the Association shall be elected by Ballot by a majority vote of the active members present at the Annual Meeting. They shall hold office for one year or until their successors have been chosen.

Section 2. All officers of the Association shall hold office for one year from the adjournment of the Annual Meeting at which they are elected and until their successors shall have been elected. In the case of a vacancy occurring in any office during the year the Excutive Board shall fill the vacancy for the unexpired term.

Section 3. The President shall have general supervision over the affairs of the Association, shall preside at all meetings and shall perform such other duties as usually devolve upon a presiding officer.

Section 4. The Senior Vice-President shall perform the duties of the President in the absence of the latter. In the absence of both President and Senior Vice-President, the Vice-Presidents present shall elect one of their number to act as President.

Section 5. It shall be the duty of the Secretary to keep the records and conduct the correspondence of the Association, to send out all notices of meetings and other literature and provide a report at each Annual Convention of the proceedings of the past year, including a report of the membership and of the proceedings of the Executive Committee. He shall collect all monies due the Association and issue receipts for same and turn them over to the Treasurer, obtaining receipts from him.

Section 6. The Treasurer shall have charge of all monies and pay all bills which have been approved for payment by the President. He shall keep regular accounts of all receipts and expenditures and shall report at the Annual Meeting. He shall also give a bond of the faithful performance of his duties as determined by the Executive Board.

Section 7. Meeting of the Executive Board may be called by the President or by any three members of the Board and five members shall constitute a quorum.

Section 8. No obligations shall be incurred in the name of the Association except upon written authority of the President.

Section 9. The President shall appoint an Auditing Committee consisting of three members, who shall audit the accounts of the Secretary and Treasurer each year.

DUES.

Section 10. The Annual dues for Active Membership shall be $5.00 per member or representative, payable annually in the month of July.

Section 11. Members whose dues are not paid within two months after the adjournment of the Annual Convention shall be considered in arrears.

Section 12. Only members, who are not in arrears for dues shall be considered members in good standing.

Section 13. Members whose dues for the previous year remain unpaid at the beginning of any fiscal year shall be dropped. Dropped members may be reinstated upon application, accompanied by remittance of all monies due the Association. All such applications for reinstatement to follow the course stipulated for the applications of new members by the by-laws.

Section 14. No dues shall be collected from Honorary Members.

APPLICATIONS FOR MEMBERSHIP.

Section 15. All applications for membership shall be made to the Secretary.

Section 16. On the first day of each month the Secretary shall mail each member of the Executive Board a list of the applications for membership received during the preceding month. If within two weeks he shall have received a written protest of two or more of the members of the Executive Board against the election of one and the same applicant, such applicant shall be considered rejected, otherwise the applicant shall be considered elected and the Secretary shall enroll the applicant as a member and at once notify him of his election and send him a bill for dues.

ORDER OF BUSINESS.

Section 17. The order of business to be observed at Annual Meeting shall be as follows:

(1) Reading of minutes of last meeting.
(2) Announcement by the President of special committees as follows:

A committee of five to nominate officers for the following year.

A committee of three to audit the accounts of the Secretary and Treasurer.

A committee of five to report on papers to be presented to the Association.

(3) Report of officers and standing commitees.
(4) Report of special committees.
(5) Unfinished business.
(6) New business.
(7) Election of officers.

AMENDMENTS.

Section 18. These by-laws may be amended by a two-thirds vote of the members in good standing present and voting at any regular meeting.

ITEMS OF INTEREST TO THE INDIVIDUAL.

DANIEL GILBERT.

Fifty-six years in the employ of one firm is a record seldom achieved by any able workman. It is generally supposed that only bank employees are such fixtures in any one place. However, the subject of our sketch, Daniel Gilbert, has rounded out fifty-six years of service with the Russell & Erwin Manufacturing Company, of New Britain, Conn. He entered the employ of the company at the age of 16 years and has remained with them steadily ever since. He is now 72 years of age, well and hearty, controverting the prevalent opinion that brass workers are short lived.

Mr. Gilbert was born in Berlin, Conn., 1836, and moved to New Britain, of that State, when young, entering the employ of the Russell & Erwin Manufacturing Company at the age of 16. All his life he has been finishing brass, with a little iron work occasionally and has invented a machine for winding brass strings and has also improved his hub milling lathe at which he works. His experience in machine work and his way of relating his experiences are very interesting. He also is of a philosophical turn of mind, and when there is any serious change in business affairs he remarks: "I just keep plugging away and let other folks do the necessary worrying. I find it pays." Mr. Gilbert is probably the oldest brass worker in the United States, and our cut shows him working at his lathe.

DANIEL GILBERT.

Arthur L. Walker has been appointed professor of metallurgy at Columbia University, his appointment taking effect July 1. Mr. Walker was formerly consulting engineer and member of the board of direction of the American Smelting & Refining Company. He is well known throughout the country as a metallurgist.

The employes of the Philadelphia Roll & Machine Co., Philadelphia, Pa., surprised their general manager, August Marx, when they presented to him at the works at noon, July 2nd, a handsome leather club bag, fitted complete, as a token of their esteem and appreciation on the occasion of his trip abroad for a sojourn of a few months.

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

886,572. May 5, 1908. Metal Working Machine. Stanislas Zietarski, Newark, N. J. This invention relates to an improvement in metal working machines, whereby copper or other metals may be rolled into various articles of manufacture. The metal is first brought into a circular disk shape and is then placed between rolls. The rolls are then brought together under pressure and the disk reduced in thickness and increased in area according to the shape of the article to be formed. The disk may be guided by hand or by any other suitable means, and as it is flattened out, may be moved up or down into the desired form of the finished articles.

886,111. April 28, 1908. Process of Manufacturing Crucible Compounds. Carl Caspar, Stuttgart, Germany. This invention relates to the manufacture of crucibles having high and very thin walls, and the materials of which must not be absorbed by the highly refractory metal being melted. The fireproofing of the crucible is accomplished with pure amorphous oxide of aluminum.

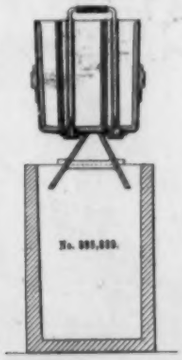
884,228. April 7, 1908. Molding Machine. Herman Sonnenberg, of Brooklyn, N. Y. In this molding machine it is possible to form any number of objects or bowls at the same time, depending upon the number of cavities and openings formed in the elements constituting the molds. Since the molds join in planes horizontal to the vertical axis of the object to be formed, the seams formed in the object will be in planes perpendicular to their vertical axis.

891,489. June 23, 1908. Molding Machine. Wilfred Lewis, of Philadelphia, Pa. Assignor to the Tabor Manufacturing Company, Camden, N. J. The main object of this invention is the provision of effective means for manipulating the mold supporting flasks and for drawing the patterns from the molds after the latter are formed. In this particular invention a molding machine is employed in which the sand is settled around the pattern of the mold by jarring the table or support on which the pattern and surrounding flasks are supported. It is stated that this apparatus has been found in practice to be simple and reliable in operation and to facilitate greatly the formation of molds.

891,435. June 23, 1908. Power Press. V. K. V. Palmer, Brooklyn, N. Y. In the power presses of the type covered by this invention the plunger and crank are connected in such a manner that the plunger has a vertical movement equal to the

greatest throw of the crank, and as a result the punch, which is connected with the plunger, is raised so high above the stripper that the operator frequently passes his hand beneath the plunger and thereby runs the risk of serious injury. One of the objects of this invention is to provide means whereby the vertical movement of the plunger will be limited to such an extent that the danger of inserting the hand beneath it or between the punch and the stripper will be entirely overcome, the movement of the plunger being just sufficient to strip the material off of the punch. The vertical movement of the plunger may be regulated at will.

885,839. April 28, 1908. Manufacture of Compound Ingots. William H. Connell, Pittsburg, Pa. This invention has for its object the bringing together of two bodies of metal while in a molten condition under such conditions that the metal of the



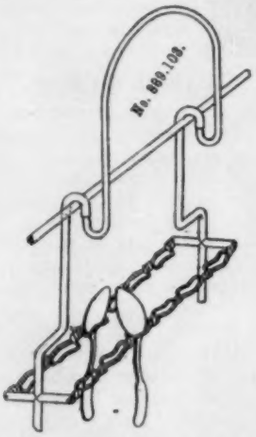
two bodies will intermingle in the interior of the ingot, but will maintain their distinct characteristics at opposite sides of the ingot. The ladle is divided into two compartments, each provided with outlet openings controlled by plugs which are opened simultaneously. The streams of metal flow closely adjacent to opposite sides of the ingot, but they are spread out by flowing over plates. When these flat streams strike the bottom of the mold or the metal contained therein, they will flow laterally and meet in a plane the position of which will vary in accordance with the relative volumes of the metals. By this method the two streams of metal are kept separate and distinct one from the other.

889,407. June 2, 1908. Device for Changing Rolls. Henry C. Shaw, Glenshaw, Pa. The object of this invention is to provide a simple device for removing rolls from the housings of rolling mills and inserting other rolls in their stead. The device for handling the rolls is so designed that both the rolls being removed and the roll substituted are maintained in a horizontal position even though one roll may be heavier than the other one.

890,337. June 9, 1908. Manufacture of Compound Ingots. Wm. H. Connell, Pittsburgh, Pa. In this invention provision is made so that metals having different characteristics may be poured into the mold in different parts of the mold at the same time or they may be poured one after the other as may be deemed most desirable. In this way an ingot may be formed of different composition in different portions.

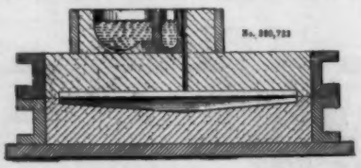
890,882. June 16, 1908. Plating Rack. Henry V. Smith, Bridgeport, Conn. This invention relates to the electroplating of spoons, forks, etc., and has for its object to provide a rack for holding these articles while in the bath. The rack is so shaped as to "shadow" or protect the inner sides of the bowls and handles of spoons or forks so that very much less silver will be deposited on these sides than on the exposed or outersides. It is well understood that in use a great portion of the wear upon plated spoons and forks is upon the bowls and handles. It is desirable, therefore, to deposit a greater amount of silver upon these portions of the articles than is deposited upon the inner sides, and to perform this operation of practically double plating the backs and single-plating the innersides at a single operation this device is provided.

889,103. May 26, 1908. Holder for Electroplating. William Y. Buck, Muncie, Ind. In general this invention relates to that method of electroplating which consists in holding between two anodes in an electrolytic bath separate pieces of work facing toward and near each other and in passing current from the



anodes through the plating solution to the work while held in that position. The device is especially designed for plating spoons, forks and other articles of flatware which are to be plated unequally upon the opposite sides. As shown in the drawing, the articles are so held that there is no danger of their turning or facing about, and when slightly displaced by accident they return to their predetermined positions. A further object is to prevent markings upon the work where it touches the holder and to diminish electrodeposition upon the holder and at the same time to increase the inequality of the deposit upon the opposite sides of the work. To accomplish these objects there is incorporated in the holder an indefinite number of connected and partly insulated wire loops which are of a peculiar pattern and are peculiarly positioned.

889,723. June 2, 1908. Casting Device. Philip Schwickart, New York, N. Y. This device is for the purpose of insuring the proper filling of the mold with the molten metal and without danger of slag, scum or like impurities passing with the



molten metal into the mold, thereby insuring the formation of very fine homogeneous castings. From the accompanying sectional view of the device its construction and the method of its operation will be readily perceived. It is placed outside of the flask and automatically purifies by a skimming action of the molten metal in its passage to the mold.

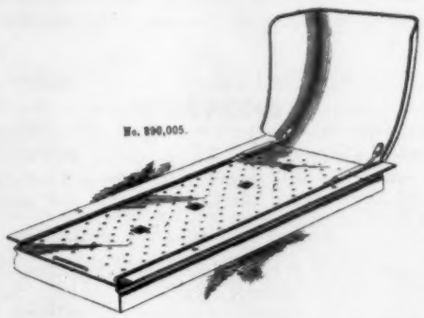
890,946. June 16, 1908. Metal Polish. Earl V. Voris and Patrick H. Carroll, of Kirkland, Wash. This composition, intended particularly for cleaning and polishing metal work, such as silverware, is composed of 10 per cent. asbestos, 60 per cent. magnesia, 30 per cent. talc.

891,070. June 16, 1908. Wire Drawing Apparatus. George A. Hoyt, Cleveland, Ohio. Assignor to the American Steel and Wire Company of Chicago, Ill. In this apparatus the design is such that the drawing block will automatically stop as soon as the last end of the wire has passed through the die or when the wire breaks between the block and die. It will also stop when the tension on the wire is released. The block when once stopped will not start again except by the manual operation of the operator.

889,629. June 2, 1908. Catcher for Metal Plates. Arthur J. Maskrey, Chester, W. Va. This invention relates to improve-

ments in catchers for metal plates and is particularly adapted for use with tin and terne plate apparatus. It is arranged so as to grasp the sheets of metal as they rise from the rolls of a tinning pot and for delivering these sheets to guides leading to a branner. It may be used in connection with any style of tin or terne plate coating machine and will handle the plates automatically. It is adjustable to meet the requirements of different sizes of sheets and is also adjustable to regulate the grip or pressure applied to the sheets, which are gripped lightly along the edges and are not, therefore, marked with large grease spots.

890,005. June 9, 1908. Device for Catching Gold Filings, Etc. Edwin P. Wright, Richmond, Va. This invention provides a shallow pan having a perforated top, through which the filings or clippings pass and are collected in the pan beneath.



The construction of the device is such that it may be supported in different places according to the character of the work performed. For instance it may be arranged as a drawer to a bench for location below a block or anvil, or it may be provided with a shield for use in connection with a grinding stone, or it may be supported by a bracket convenient to a cabinet or work stand.

891,042. June 16, 1908. Molding Machine. John W. Crosby, Bradford, Pa. This machine consists of a plurality of molding devices, each consisting essentially of a stripping plate which supports a flask and a pattern movable into and out of the flask, a sand supplying device, a sand pressing device and a carrier whereby the flask and molding devices are presented successively to the sand supplying and pressing devices. Each cycle of operations comprises four steps, during the first of which an empty flask section is placed upon one of the stripping plates; during the second step a charge of molding sand is delivered into the flask section; during the third step the sand in the flask is pressed against the pattern in the same, and during the fourth step the pattern is withdrawn from the sand, permitting the attendant to remove the flask section containing the finished mold from the stripping plate and replacing the same by an empty flask section.

890,895. June 16, 1908. Pyrometer. Charles Fery, Paris, France. According to this invention the radiation proceeding from a hot body is focused by the action of a suitable member, such as convex lens or concave mirror upon an expansible body, and means are provided for indicating the amount of the expansion of such body, which is a measure of the temperature of the hot body. Thus a pyrometer according to this invention is complete in itself without the use of auxiliary apparatus. The indicating means are such that the expansion of the body is made apparent upon a magnified scale; for instance a light pointer may be employed, or one of the usual methods of magnifying motion by means of a beam of light on a scale. The body, which expands when heated by the radiation from the hot body is preferably of metal; for example two thin strips of dissimilar metals may be soldered together and formed into a flat spiral of the kind generally known as Breguet's spiral. Such a spirial either becomes partly untwisted or twists up further when its temperature is raised.

TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

Thornton & Son, of Selleville, Ill., have just installed a plating outfit and are now ready to replate gold and silver work.

The Geneva Plating Company, of 136 Andes avenue, Geneva, N. Y., are starting in the brass business and would like to hear from firms who can give them information in this line.

The Cutler-Hammer Manufacturing Company, of Milwaukee, makers of electric controlling devices, will be represented on the Pacific coast by Otis & Squires, of 111 New Montgomery street, San Francisco, Cal.

The Occidental Metal & Manufacturing Company, of Kansas City, Mo., has leased a tract of land at Eureka, St. Louis County, and will establish a manufacturing plant. Brass goods will be the principal articles made.

The Mattatuck Manufacturing Company, of Waterbury, Conn., makers of metal specialties, have awarded the contract for an addition to their plant. The new structure will be a four-story brick building 42 by 143 feet.

Max Bechtle, lamp and metal works, and who makes a specialty of repairing auto lamps and radiators, and does gold and silver plating, has removed his plant from 953½ Clay street to 327 9th street, Oakland, Cal.

The Stover Mfg. Co., Freeport, Ill., announce that they are now well equipped to do job work such as electro-galvanizing, nickel, copper and brass plating. They also make a specialty of small grey iron, brass and aluminum castings.

The American Manufacturing Company, of West Cheshire, Conn., make all kinds of brass castings and also manufacture small brass novelties. They also contemplate making a line of plumbers' supplies. The company do their own plating.

The Standard Roller Bearing Company, of Philadelphia, Pa., announces further expansion of its sales organization by the opening of a branch office at 327 Jefferson avenue, Detroit, in charge of Ernest L. Smith, recently appointed Western representative.

The Mohawk Valley Brass Foundry, of Utica, N. Y., is now under the management of Owen E. Lewis, who is prepared to handle anything in the line of brass castings. The foundry is well equipped in every way and the work turned out is of the highest grade.

The largest brass casting ever sent out of Poughkepsie, N. Y., was shipped recently by the Poughkeepsie Brass Foundry. It was a 14-inch water cylinder made of Government metal, 88-10-2, weighing 2,000 pounds each. There were three to make in the

order, and all have been cast without a flaw. S. L. Bartlett is the superintendent of the foundry.

The firm of Larter & Sons, manufacturers of jewelry, have broken ground at the corner of Parkhurst and Austin street, New York City, for a new building. The building will be of reinforced concrete construction and will measure 83 by 138 feet. It will contain powerhouse, vaults and manufacturing departments. It is expected that it will be completed by October 1 next.

The Laclede-Christy Clay Products Company, of St. Louis, Mo., have acquired the business, property and good will of the Jamieson-French Fire Clay Company, of Lake Junction, St. Louis County, Mo. Henry K. Lackland, formerly secretary and general manager of the above company, will be associated with the purchasing company in the capacity of manager of their high grade clay department.

A plating supply house of international fame, entitled The Langbein-Pfanhauser Works, Ltd., Leipzig, Germany, have established a branch works and sales office at 18 Constitution Hill, Birmingham, England, and are also planning to have a branch office, works or storehouse in the United States. The company manufacture a variety of plating apparatus and the Birmingham office issues a catalogue printed in English which will interest many platers.

The National Cash Register Company, of Dayton, O., thought that when they put on 18 additional molders they would be able to keep up with the factory, but they are still running behind the orders. During the last week in June they turned out 14,466 pounds of gold castings per day. That they may keep abreast the orders they have started a night gang of 20 molders, in addition to the 83 that work during the day and who also work overtime. With this they expect to run their product up to 20,000 pounds of good castings per day. During the month of June the factory turned out 8,270 registers, and they expect to turn out 9,000 during July.

The following interesting item we find in the Bristol (Conn.) *Press:* The ladies employed in the offices of the Bristol Brass Company, both at the mill and the burner factory, and of the American Silver Company, gave a picnic to the men in the offices at Lake Compounce on Tuesday evening. There were twenty-nine in the party. After all had enjoyed a very fine supper, S. B. Harper spoke some words of appreciation in behalf of the entertainment by the ladies. After W. H. Carpenter's appeal for three cheers for the girls had been responded to vociferously, the party enjoyed boating, the vaudeville and other attractions of the lake. The evening passed off most pleasantly.

Since C. K. Sandborn took over the business of the Bay States Brass Company, with works at Haydenville, Mass., and New York office at 150 Nassau street, the business has so increased they have found it necessary to enlarge their plant in order to keep pace with the orders. They have just completed a large addition to the main shop and foundry, together with new boiler house and fireproof pattern vault. With the enlargement in the main building, additional equipment in the shape of automatic machinery, monitor lathes, etc., have been installed, so that today the factory is equipped to handle a large volume of business. A pleasing feature of this company is the interest the employes take in it, and to show their appreciation of Mr. Sanborn's efforts they presented him with a facsimile of the "Sanborn" Fuller Basin Cock, measuring over 2 feet high, and same was placed on the tower of the new factory, where it makes a very handsome as well as appropriate ornament to the building. This plant is now running full time and the working force is being increased each week; they have enough orders on hand to keep going at least three months. They are exclusive manufacturers of high grade fuller and compression work.

The manufacturing chuck for monitor lathes which was described on page 155 of our May issue, is now being used by many important concerns. A number of these chucks are employed at the Westinghouse Electric & Manufacturing Company's works at Pittsburg and at Newark, N. J., and in the shops of the Westinghouse Air Brake Company at Wilmerding, Pa. The U. S. Navy Yard at Brooklyn uses them, as does also the J. L. Mott Iron Works, Trenton, N. J., The American Sugar Refining Company, and Schroder's Lamp Works of Jersey City, N. J.; The J. B. Colt Company, The Dale Company, J. B. McCoy & Son, A. Schroder's Son, Inc., Schuchardt & Schutte, The Smith & Mabley Manufacturing Company, The Prentiss Tool & Supply Company, and The Nathan Manufacturing Company, of New York; The Neptune Meter Company, Long Island City, N. Y.; The Eaton, Cole & Burnham Company, Bridgeport, Conn.; The Schaefer & Budenberg Manufacturing Company, Foxboro, Mass.; The McNab & Harlin Manufacturing Company, Paterson, N. J.; John Knickerbocker, Troy, N. Y., and The Monarch Brass Company, and the United Brass Manufacturing Company, of Cleveland, O. These chucks are made by W. L. Abate, Mount Vernon, N. Y., who states that each of the above firms has installed from one to eight of them. One of the most recent installations ordered is for the Bay State Brass Works, Haydenville, Mass., who are equipping the lathes in their new shop with these manufacturing chucks.

REMOVALS

S. M. Cohn has established headquarters at 81 Fulton street, New York, where he will continue to handle scrap metals of all kinds, and ingot copper, tin and lead. He will also deal in all kinds of foundry residues.

The Hercules Brass Foundry have moved their plant from Reading, Pa., to West Reading, Pa. The removal was made necessary owing to the increasing business of the firm. Up-to-date machinery has been added and many improvements and alterations have been made. The firm employs 18 hands in their brass foundry and is running full time.

On account of the biulding of the $20,000,000 depot for the Northwestern Railroad Company, at Chicago, Ill., and the fact that all the buildings are being demolished, many firms connected with the trade have been compelled to move to new quarters. Among them are the following: Star Plating Works to 68 West Monroe street, Samuel Lyon & Sons to 20 Jefferson street, Metal Novelty Works Company to 85 Lake street, and Charles H. Debs and Company to 133 Clinton street.

Leiman Brothers, the well-known makers of sand blasts, air compressors, and other foundry and factory equipment, are moving their New York salesrooms to 62 John street, where they will be more accessible to the ferries and Hudson tunnels than heretofore, and where they will have six times as much space as their present quarters afford. At the new address they will have on exhibition and in running order a full line of their goods, so that interested persons can inspect them in actual operation, and, if they so desire, can bring samples of their own goods and try them out on the machines. A complete repair department will also be maintained. The firm issues a long list of names of prominent concerns in the metal founding and finishing trade who have recently installed Leiman sand blast outfits, included in which are the Victor Talking Machine Co., Camden, N. J., Tiffany Studios, Corona, L. I., American Button Works, Newark, N. J., and the United States Government.

FINANCIAL

The Seneca Wire & Manufacturing Company, of Fostoria, O., has increased its capital from $100,000 to $150,000.

INCORPORATIONS

In addressing newly formed corporations it is advisable to include the names of the incorporators.

THE STANDARD BRASS & IRON WORKS, of Milwaukee, Wis., has been incorporated with a capital of $25,000 by O. L. Hower, R. G. Nashold, and Paul D. Durant.

THE QUEENS BOROUGH BRASS & BRONZE FOUNDRY, of Astoria, N. Y., has been incorporated with a capital of $3,000 by Arnold H. Dale, Thomas MacIntyre and George G. Miller.

THE STANDARD ART METAL WORKS, of East Orange, N. J., has been incorporated to make brass novelties and specialties, with a capital of $100,000, by J. H. Gleim, T. E. Grimm, G. A. Rettenmaier, all of East Orange.

THE PATERSON METAL STAMPING COMPANY, of Paterson, N. J., has been incorporated with a capital of $25,000 to deal in metal stampers. The incorporators are Benjamin F. Chase, Frederic Beggs, and William H. Burpo.

THE METALS SUPPLY COMPANY, of Newark, N. J., has been incorporated with a capital of $50,000 to manufacture metal novelties. The incorporators are Henry L. Harrison, Oswald R. Routh and Remington A. Sickles.

RICHARD B. CARREN & SONS COMPANY, of Ludlow, Ky., have been incorporated with a capital of $2,000 to manufacture all kinds of brass and other metal castings. The incorporators are R. B. Carran, Arch Carran, and Carl Carran, all of Ludlow.

THE MANUFACTURERS' EQUIPMENT COMPANY, of Chicago, Ill., has been incorporated with a capital of $20,000 to manufacture special machinery and tools, and brass and iron goods. The incorporators are M. J. Hanninn, Paul J. Grebel and William J. Theis.

THE UNIVERSAL METAL SPECIALTY COMPANY, of New York City, has been incorporated to manufacture novelties and specialties, hardware, etc., by H. G. Ingersoll, F. W. Mayes, G. E. Spare, J. T. McCall, all of New York City, and F. Tench, of White Plains, N. Y. The capital is $75,000.

THE CLASM ENGINEERING COMPANY, of New York City, has been incorporated with a capital of $25,000 to carry on the work of tool makers, brass founders and general metal work. The incorporators are W. P. Christopher, C. De Lukacsevices, of New York City, and S. P. Allen, of Scranton, Pa.

THE AUTOGENOUS WELDING COMPANY, of Springfield, Mass., has been incorporated with a capital of $15,000 for carrying on the business of welding and cutting metals. The incorporators are President Henry Cave, of Elizabeth, N. J., Treasurer Lawrence C. Fay, and clerk Fred M. Fay, both of Chicopee, Mass.

THE HANLON, THORNTON COMPANY, North Attleboro, Mass., has been incorporated with a capital of $50,000 to manufacture a general line of jewelry. The officers are John Hanlon, treasurer; Michael F. Hanlon, clerk, and William S. Thornton, director. The company began business in a small way some years ago, but during the past year has branched out considerably.

PRINTED MATTER

ALUNDUM WHEELS. The grinding wheels made by the Norton Company, of Worcester, Mass., are made of alundum because that is believed to be a better abrasive than any other. The company have issued a pamphlet containing helps and don'ts; although the pamphlet is small, it is full of valuable information for all those having to do with grinding wheels.

VENTILATING FANS. The Massachusetts Fan Co., Watertown, Mass., has just issued an exceedingly attractive booklet, entitled "Davidson Ventilating Fans." The illustrations show both pulley fans and many types of electric fans driven by standard motors of various makes. These are applicable for the economical movement of large volumes of air at moderate pressures.

GRINDING ATTACHMENTS AND CENTER GRINDERS. These tools are very thoroughly covered in a catalogue prepared by the Diamond Machine Company, of Providence, R. I. Their grinding attachment is intended for handling a wide variety of grinding on cutters, reamers, rolls, collars, etc., in a first-class manner, while costing far less than a special machine for this work.

SEAMLESS TUBING. "Here's another little steel tube. It wanted to go to you, and we let it. Seamless—of course." This we find on a card, to which a small piece of tubing is attached, from the Ellwood Ivins Tube Works, Oak Lane Station, Philadelphia, Pa. This concern makes tubing of steel, aluminum, copper, brass, in sizes ranging from a little larger than an eyelash up.

PRESSES, DIES AND TOOLS. Machines and tools for the manufacture of sheet metal goods, and special and experimental machinery, are described in a large catalogue by Charles Leffler & Company, of Brooklyn, N. Y. This company make tools and machinery for the most economical production of tin or sheet metal ware of every description, and they are also prepared to design and build machinery for special purposes.

RECORDING THERMOMETERS. The Bristol Company, of Waterbury, Conn., have prepared a large pamphlet covering their latest form of recording thermometers for temperatures between 40 and 500 degs. F. These instruments depend for their operation upon the pressure of the vapor of a liquid in the sensitive bulb which is exposed to the temperature to be recorded. The liquid, usually alcohol, is contained in a small bulb, which it partly fills. This bulb is connected with a Bristol Recording Pressure Gage by a small flexible copper tube 25 feet or more in length.

BELTING. We have received a folder from the New York Belting & Packing Company, Ltd., 91-93 Chambers street, New York City, on the general subject of brands. We find the following axiomatic remark: "He who can judge correctly of the value of rubber goods in the absence of the manufacturer's trademark is a wise man." The trademark of a good firm means established value and is a stamp of reliability which standardizes the article. The company make rubber belting, hose of all kinds, mats, packing of all kinds, diaphragms, tubing and all kinds of rubber specialties and hose to order.

PLUMBERS' BRASS GOODS AND SANITARY SPECIALITIES. The Bay State Brass Company, of Haydenville, Mass., brass founders, have issued an exceedingly attractive catalogue covering their products. These works were founded only two years ago by a few of the old skilled brass mechanics in the town of Haydenville. These men, through their many years of experience, have equipped an up-to-date mill with all modern tools, patterns and machinery. The patterns are of the finest and nothing but the highest grade of goods is turned out from this shop. The catalogue, which is beautifully illustrated with well executed halftones, describes plug bibbs, stop and hydrant cocks, also Boston and Doherty patterns of self-closing work.

FLEET TO HANDLE SAND. We have received from J. W. Paxson Company, of Philadelphia, Pa., a copy of their Bulletin No. 18, one of the leading features of which is the description and illustrations of the Paxson's freight lines for the transportation of their sands. The company have always availed themselves of the latest methods of transportation, and they now have a finely equipped line of river and ocean-going tugs, steam and towing barges along the coast, and are in position to freight or charter at satisfactory rates. The catalogue also covers core making machines, wooden core boxes and rosin grinders, because they are closely connected with core sand. There is also much information about sand blast machines and sand blast sand, as well as fluxings, alloys and partings for iron, brass and steel foundries.

CATALOG BUREAU

We have established a Catalog Bureau and are prepared to do all the work necessary for the making of catalogs, pamphlets, circulars and other printed matter. Estimates will be furnished for writing descriptions, making engravings, printing, binding—in fact for the entire job from beginning to end or any part of it. Let us know your needs and we will tell you exactly what we can do and what it will cost you.

DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Metal Market Report of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the Report alone is $10. We can also furnish daily mill and factory reports covering all the news of mills, factories and machine shops to be built. Send for particulars.

ANALYZING AND TESTING BUREAU

THE METAL INDUSTRY is independent of all laboratories, but we offer our services in directing our readers where they can get metals, materials and supplies analyzed and tested to the best advantage. We have an intimate knowledge of the best laboratories in the country and know the specialties of the different ones. Cost furnished on receipt of sample.

AD. WRITING

This department prepares advertising copy and makes cuts, photos or drawings. Our experience, and what skill we may have in ad. writing, are at your disposal at all times and as often as you may desire without cost to you. If it is a task for you to get ready your advertisements, send to THE METAL INDUSTRY.

INFORMATION BUREAU

Any concern intending to buy metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain this information by writing to THE METAL INDUSTRY. Our Information Bureau is for the purpose of answering questions of all kinds.

PATENT BUREAU

Any of our readers intending to take out patents or trade marks can learn of reliable attorneys who will look after their interests to best advantage by simply writing to THE METAL INDUSTRY.

OFFICE HEADQUARTERS

When visiting New York the out-of-town friends of THE METAL INDUSTRY are invited to make our office their headquarters where writing desks and telephone service will be at their disposal. Every one interested in the non-ferrous metals is invited to call. THE METAL INDUSTRY, 61 Beekman Street, New York.

METAL MARKET REVIEW

New York, July 9, 1908.

COPPER.—The London copper market has advanced about £3 per ton during the month and the trading has been fairly active. The New York market continues to drag along in a very unsatisfactory condition, consumers are only buying for their immediate needs and seem to have no faith in the future of the metal. The foreign stocks according to the half-monthly statistics show an increase for the two weeks of over 5,000 tons. The total exports for the month of June were 29,749 tons, making the total exports for the first six months 163,621 tons, against 82,514 tons during the same period last year. These heavy exports are the strongest features of the market, but the home demand is so poor that prices here are a shade lower than a month ago, although the London price is higher. Prices here can hardly be advanced unless the consuming demand is very much more active. We quote the market to-day fairly steady. Lake around $12.75, electrolytic $12.65, casting brands $12.35.

TIN.—The London tin market has been fairly active, opening at £127, and after advancing to £130 15s., closed at £124 17s. 6d., showing a net decline for the month of £2 per ton, and the market is more or less weak at the close. The New York has declined during the month about one cent per pound following the decline abroad. The consumption for the month was 3,000 tons, against 4,000 tons during May. The total shipments for the month from the Straits were 4,625 tons, against 7,000 tons for the month of May. The New York market closes at 27.25 against 28.25 at the opening.

LEAD.—The London market has declined about 10s. per ton during the month, opening at £12 15s., and closing at £12 5s. The New York market has ruled fairly strong and prices have advanced about 15 points during the month. The demand has been fairly good and the market is in better shape than for some time.

SPELTER.—The London market has declined £1 5s. during the month, opening at £19 15s., and closing at £18 10s.

The New York market has ruled fairly steady but closes about 5 points lower than at the opening. New York delivery to-day is quoted at 4.50 against 4.55 a month ago.

ANTIMONY.—There is very little change in this metal during the month, prices are possibly one-quarter cent per pound lower. Cooksons around 8.50, Halletts 8.25, other grades 7.75 to 8.00.

ALUMINUM.—There is no change in the quoted prices for aluminum and the demand is not very active. We quote 33 cents for No. 1 pure ingots, rods and wire 38c., sheets 40c.

SHEET METALS.—There has been no change in the sheet copper or brass, and the demand has not been as active as it might have been.

SILVER.—The silver market is a shade firmer and prices have shown a slight advance for the month. New York to-day 53½c. against 52⅝c. a month ago.

OLD METALS.—The old metal market has been very dull and prices are nominally unchanged from a month ago.

THE JUNE MOVEMENTS IN METALS

	Highest.	Lowest.	Average.
COPPER—			
Lake	13.00	12.75	12.80
Electrolytic	13.00	12.50	12.70
Casting	12.75	12.00	12.50
TIN	28.85	27.25	27.75
LEAD	4.50	4.35	4.40
SPELTER	4.62½	4.45	4.35
ANTIMONY (Halletts)	8.75	8.50	8.65

See Advertising Pages 21 and 22 Following for Trade Wants

Metal Prices, July 13, 1908

NEW METALS.

	Price per lb.
COPPER, PIG, BAR AND INGOT AND OLD COPPER. Duty Free. Manufactured 2½c. per lb.	
Lake, car load lots	12.75
Electrolytic, car load lots	12.62½
Castings, car load lots	12.35
TIN—Duty Free.	
Straits of Malacca, car load lots	27.50
LEAD—Duty Pigs, Bars and Old 2½c. per lb., pipe and sheets 2½c. per lb.	
Pig lead, car load lots	4.50
SPELTER—Duty 1½c. per lb.	
Western, car load lots	4.50
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb.	
Small lots	35.00
100 lb. lots	34.00
Ton lots	33.00
ANTIMONY—Duty ¾c. per lb.	
Cookson's, cask lots, nominal	8.50
Halletts, cask lots	8.25
Other, cask lots	7.75
NICKEL—Duty 6c. per lb.	
Shot, Plaquettes, Ingots, Blocks, according to quantity	45 to .60
MANGANESE—Duty 20%	.80
MAGNESIUM—Duty Free	$1.40
BISMUTH—Duty Free	1.80
CADMIUM—Duty Free	1.40
	Price per oz.
GOLD—Duty Free	$20.67
SILVER—Duty Free	.53½
PLATINUM—Duty Free	21.00
QUICKSILVER—Duty 7c. per lb. Price per pound....60c. to 61c.	

OLD METALS.

	Price per lb.	
Heavy Cut Copper	10.50	11.00
Copper Wire	10.00	10.50
Light Copper	9.00	9.50
Heavy Mach. Comp.	10.00	10.50
Heavy Brass	8.00	8.50
Light Brass	6.00	6.25
No. 1 Yellow Brass Turnings	7.00	7.50
No. 1 Comp. Turnings	8.00	8.50
Heavy Lead	3.50	3.60
Zinc Scrap	3.00	3.50
Scrap Aluminum, turnings	6.50	7.00
Scrap Aluminum, cast, alloyed	15.00	18.00
Scrap Aluminum, sheet (new)	20.00	21.00
Old Nickel, solid	20.00	23.00
No. 1 Pewter	18.00	19.00

INGOT METALS.

	Price per lb.
Silicon Copper ....according to quantity	33 to 38
Phosphor Copper, 5% " "	19 to 21
Phosphor Copper, 10% to 15% Guaranteed " "	28 to 30
Phosphor Tin " "	34 to 36
Brass Ingot, Yellow " "	10 to 11
Brass Ingot, Red " "	12 to 14
Bronze Ingot " "	11 to 13
Manganese Bronze " "	14 to 17
Phosphor Bronze " "	13 to 16
Casting Aluminum Alloys " "	29 to 35

PHOSPHORUS—Duty 18c. per lb.
According to quantity ..... 32 to 40

PRICES OF HOT ROLLED SHEET COPPER.

	SIZES OF SHEETS.	64 oz. and over 50 lb. sheet 30 x 60 and heavier.	32 oz. to 64 oz. 25 to 50 lbs. sheet 30 x 60.	24 oz. to 32 oz. 18¾ to 25 lb. sheet 30 x 60.	16 oz. to 24 oz. 12½ to 18¾ lb. sheet 30 x 60.	14 oz. and 15 oz. 11 to 12½ lb. sheet 30 x 60.	12 oz. and 13 oz. 9½ to 11 lb. sheet 30 x 60.	10 oz. and 11 oz. 7¾ to 9½ lb. sheet 30 x 60.	8 oz. and 9 oz. 6¼ to 7¾ lb. sheet 30 x 60.	Lighter than 8 oz.
		CENTS PER POUND.								
Not wider than 30 ins.	Not longer than 72 inches.	17	17	17	17	18	19	20	23	26
	Longer than 72 inches. Not longer than 96 inches.	17	17	17	17	18	20	23	26	
	Longer than 96 inches.	17	17	17	17	19	23			
Wider than 30 ins. but not wider than 36 inches.	Not longer than 72 inches.	17	17	17	17	19	21	24	27	
	Longer than 72 inches. Not longer than 96 inches.	17	17	17	17	19	23	26		
	Longer than 96 inches. Not longer than 120 inches.	17	17	17	18	20				
	Longer than 120 inches.	17	17	18	19					
Wider than 36 ins. but not wider than 48 inches.	Not longer than 72 inches.	17	17	18	19	21	24	27		
	Longer than 72 inches. Not longer than 96 inches.	17	17	18	20	22	25			
	Longer than 96 inches. Not longer than 120 inches.	17	17	19	21	25				
	Longer than 120 inches.	17	18	20	23					
Wider than 48 ins. but not wider than 60 inches.	Not longer than 72 inches.	17	17	18	20	23	28			
	Longer than 72 inches. Not longer than 96 inches.	17	17	19	21	26				
	Longer than 96 inches. Not longer than 120 inches.	17	18	20	23					
	Longer than 120 inches.	18	19	21	25					
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 inches.	17	18	20	25					
	Longer than 96 inches. Not longer than 120 inches.	17	19	22	27					
	Longer than 120 inches.	18	20	25						
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 inches.	18	20	23						
	Longer than 96 inches. Not longer than 120 inches.	19	21	24						
	Longer than 120 inches.	20	22	26						
Wider than 108 ins.	Not longer than 132 inches.	21	23							
	Longer than 132 inches	22	25							

Rolled Round Copper, ⅜ inch diameter or over 17 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 3½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot and heavier, per lb.	21c.
12 oz. and up to 14 oz. to square foot, per lb.	22c.
10 oz. and up to 12 oz.	24c.
Lighter than 10 oz.	27c.

Circles less than 8 in. dia., 2c. per lb. additional.

Circles over 13 in. dia. are not classed as Copper Bottoms.

Polished Copper Bottoms and Flats, 1c. per lb. extra.

ZINC—Duty, sheet, 2c. per lb.	Price per lb.
Mill price, carload lots	7.00 less 8%
Open casks	8.50

Metal Prices, July 13, 1908

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect May 4, 1908, and until further notice.

To customers who purchase less than 40,000 lbs. per year and over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.13½	$0.15⅝	$0.17⅝
Wire ¼" and larger	.13¾	.15⅞	.17⅞
Wire smaller than ¼" to No. 8 inclusive.	.14⅛	.16⅜	.18⅜
Wire smaller than No. 8 to No. 10 inclusive	.15	.17⅛	.18⅞
Rods ¼" and larger to ½" diameter	.14	.16⅛	.18⅞
Rods ⅛" to 1" diameter, both inclusive	.13¾	.15⅞	.18⅜
Brazed tubing	.20	—	.22⅜
Open seam tubing	.18	—	.20⅜
Angle and channel, plain	.20	—	.23⅜

30% discount from all extras except for quality.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass	½c. per lb. net advance.
" —Best spring, drawing and spinning brass	1½c. " " " "
Wire—Extra spring and brazing wire	½c. " " " "
" —Best spring and brazing brass wire	1c. " " " "

To customers who purchase less than 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.14½	$0.16⅝	$0.18⅝
Wire, ¼" and larger	.14¾	.16⅞	.18⅞
Wire, smaller than ¼" to No. 8 inclusive	.15½	.17⅜	.19⅜
Wire, smaller than No. 8 to No. 10 inclusive	.16	.18⅛	.19⅞
Rods, ¼" and larger to ½" diameter	.15	.17⅛	.19⅞
Rods, ⅛" to 1" diameter, both inclusive	.14¾	.16⅞	.19⅝
Brazed tubing	.21	—	.23⅝
Open seam tubing	.19	—	.21⅝
Angle and channel, plain	.21	—	.24⅝

5% discount from all extras except for quality.

NET EXTRAS FOR QUALITY.

Same as above.

BARE COPPER WIRE—CARLOAD LOTS.

14¾c. per lb. base.

SOLDERING COPPERS.

300 lbs. and over in one order	17c.	per lb. base
100 lbs. to 300 lbs. in one order	17½c.	" " "
Less than 100 lbs. in one order	19c.	" " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in. O. D. Nos. 4 to 13 Stubs' Gauge, 18c. per lb.
Seamless Copper Tubing, 21c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	26	25	20	19	18	18	18	18	18	18	18	19	20	22	24	25

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 feet Brass.	Bronze.
⅜ inch	$8	$9
½ inch	8	9
⅝ inch	10	11
¾ inch	12	13
⅞ inch	14	15
1 inch	18	20
1⅛ inch	22	24
1¼ inch	25	27
1½ inch	32	35
1¾ inch	45	48
2 inch	56	60

Discount 45 and 5%.

PRICES FOR MUNTZ METAL AND TOBIN BRONZE.

Muntz or Yellow Metal Sheathing (14" x 48")	14c. lb. net base
" " " Rectangular Sheets other than Sheathing	16c. " " "
" " " Rod	15c. " " "
Tobin Bronze Rod	17c. " " "

Above are for 100 lbs. or more in one order.

PLATERS' METALS.

Platers' bars in the rough, 22¾c. net.

German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.

Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturers.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 4c. above price of pig tin in same quality.

Not over 35 in. in width, not thinner than 22 B. S. Gauge, 5c. above price of pig tin.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

Wider than..... and including.....	3in. 12in.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.
	in coils.								
No. 13 and heavier	40	40	42	42	42	42	45	45	45
" 14	40	40	42	42	42	42	45	45	45
" 15	40	40	42	42	42	42	45	45	45
" 16	40	40	42	42	42	42	45	45	45
" 17	40	40	42	42	42	42	45	45	45
" 18	40	40	42	42	42	42	45	45	45
" 19	40	40	42	42	42	42	45	46	49
" 20	40	42	42	42	42	44	47	48	50
" 21	40	44	44	44	44	46	49	50	56
" 22	40	44	44	44	46	46	49	53	57
" 23	40	44	44	44	46	46	49	55	58
" 24	40	44	46	48	48	48	51	57	60
" 25	42	45	47	49	49	49	52	59	63
" 26	42	45	48	52	52	52	57	61	67
" 27	42	46	50	54	54	55	60	64	70
" 28	42	46	52	54	55	55	62	68	73
" 29	44	47	54	56	58	58	67	73	78
" 30	44	48	56	58	62	68	76	78	83
" 31	40	53	61	64	69	77	80	83	89
" 32	51	55	63	67	75	83	90	96	101
" 33	53	57	66	71	79	90	97	106	116
" 34	56	61	68	76	84	97	109	116	126
" 35	..	71	76	86	96	106	121	131	..
" 36	..	86	96	106	121	126	141	..	..
" 37	..	110	114	135	150	165	180	..	..
" 38	..	130	145	160	175	190	210	..	..
" 39	..	150	170	190	210	230	..	..	..
" 40	..	180	210	230	250	..	..	..	..

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST OF SEAMLESS ALUMINUM TUBING.

Stubs' G. B. & S. G.	1¼"	1½"	1¾"	2"	2¼"	2½"	2¾"	3"	3¼"	3½"	3¾"	4"	4¼"	4½"
4 to 11	3 to 9	BASE PRICE 50 CENTS.									3	3	3	10
12	10										6	6	6	13
13	11										10	10	10	16
14	12	3	3	3	3	3	3	3	3	3	13	13	13	19
15	13	3	3	3	3	3	3	3	3	3	19	19	19	22
16	14	6	6	6	6	6	6	6	6	16	19	22	25	35
17	15	10	10	10	10	10	10	10	10	16	19	22	25	29	38
18	16	13	13	13	13	13	13	13	19	22	25	29	32	32	44
19	17	16	16	16	16	16	22	25	29	32	35	41	48	54
20	18-19	19	19	19	19	19	22	22	25	29	35	35	41	60	60
21	20	22	22	22	22	22	..	..	..	..	..	..	..	..	..
22	21	25	25	25	25	25	..	..	..	..	..	..	..	..	..
23	22	35	35	35	41	48	..	..	..	..	..	..	..	..	..
24	23	57	60	60	63	67	..	..	..	..	..	..	..	..	..
25	24	73	76	..	..	..	..	..	..	..	..	..	..	..	..

Prices are for ten pounds or more at a time. For prices on smaller sizes send for manufacturers' list.

PRICE LIST FOR ALUMINUM ROD AND WIRE.

Diameter. B. & S. G'ge.	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb.	38	38½	38½	39	39½	40	40½	41	42	43	44	47	52

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 50%.

GERMAN SILVER TUBING.

4	per cent.	to No. 19,	B. & S.	Gauge, inclusive	$0.60
6	"	" 19,	"	"	.70
9	"	" 19,	"	"	.85
12	"	" 19,	"	"	1.00
15	"	" 19,	"	"	1.15
16	"	" 19,	"	"	1.20
18	"	" 19,	"	"	1.30

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.

For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 40%.

PRICE OF SHEET SILVER.

Rolled sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given as prices range from 2c. below to 6c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2c. above the price of bullion.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

Advertisements will be inserted under this head at 40 cents per line, 3 lines one dollar, for each insertion, excepting Situations Wanted, 20 cents per line, 3 lines half a dollar. Answers sent in our care will be forwarded.

METALS, MACHINERY AND SUPPLIES FOR SALE

FOR SALE

One No. 275 Steele-Harvey Metal Melting Furnace.

Same was built a little over a year ago, but has never been used. For further information address

STEELE-HARVEY, care THE METAL INDUSTRY

FOR SALE

TWO HILL CRUSHERS

For crushing brass ashes and skimmings, slightly used, guaranteed to be in good condition.

Address METALS,
Care THE METAL INDUSTRY, 61 Beekman Street, New York.

We have for sale a

SECOND HAND PLATING DYNAMO

on account of same being too small for our work:

One 6 volt Card Machine rated at 700 amperes, cost $350.00, new, 8 years ago **for sale at $80.00**

F. O. B. PERU, ILL.

AMERICAN NICKELOID & MFG. CO., - Peru, Ill.

FOR SALE:—Two plating tanks, 18x24x84; one blower and other equipment for plating. Address LOUIS HAACK, care The Gramercy Brass & Iron Works, 206 E. 19th street, New York City.

FOR SALE—A PHOENIX PLATING DYNAMO; 6 volts, 3,000 amperes; direct connection to 33 H. P. 230 volt direct current motor; in good working condition. Address BOX W., care THE METAL INDUSTRY.

FOR SALE—AT A SACRIFICE, A BRICK FOUNDRY FACTORY with all of the machinery for smelting. Located at Utica, N. Y. For further information inquire of SAMUEL ELLIS, 322 Canal street, New York City.

FOR SALE—A lot of new SHEET BRASS and ALUMINUM at a bargain. WALSH'S SONS & CO., Newark, N. J.

FOR SALE—IMPROVED DRILL CHUCKS that are needed in every METAL WORKING SHOP. Address DRILL CHUCK, care THE METAL INDUSTRY.

FOR SALE—LATHES and DRILL CHUCKS, Face Plate Jaws, Centering Chucks, Planer Chucks, etc. Immediate shipment guaranteed. Address LATHE CHUCK, care THE METAL INDUSTRY.

FOR SALE.—Prompt Shipment. DROP PRESSES and AUTOMATIC DROP LIFTER to suit all requirements. Address DROP, care THE METAL INDUSTRY.

WANTED—A second hand 14 POT FURNACE. Address BOX A-6, care THE METAL INDUSTRY.

METALS, MACHINERY AND SUPPLIES WANTED

WANTED—A Second-Hand TURRET LATHE in first-class condition for use in finishing brass castings. We contemplate making a line of plumbing supplies and are in the market for the above machine. Address, TURRET LATHE, care THE METAL INDUSTRY.

WANTED—ROLLED METAL for stamping toilet sets. Address, ROLLED METAL, care THE METAL INDUSTRY.

We PAY CASH for GOLD, SILVER and PLATINUM SCRAPS, SOLUTIONS and SWEEPINGS; Old Nickel Anodes, New or Old Mercury, Bismuth, Gas Mantle Dust and Chemicals, etc. EMPIRE CHEMICAL WORKS, 416 East 52d street, New York City.

METAL, MACHINERY AND SUPPLIES WANTED—Cont'd.

CASH PAID for old precious metals and minerals in any form. Gas mantle dust, bronze powder, bismuth, platinum, mercury, nickel, etc. Address JOSEF RANDAL, 36 Fulton street, New York City.

WANTED—METALS and WASTE of all kinds. Address WALSH'S SONS & CO., Newark, N. J.

OPPORTUNITIES

WANTED

A Supply House or Individual Agent

In every city or manufacturing town to represent us in the sale of our

Automatic Buffing Machines and Polishing Devices.

Address SUPPLY HOUSE,
Care THE METAL INDUSTRY, 61 Beekman Street, New York.

BRASS FOUNDERS

Practical information bureau, 40 years' experience with trade secrets, from the furnace to the finisher. Work in all known metals, from common brass to the secret process of tempering copper. 40 formulas, worth a thousand dollars.

PREPAID TO ANY ADDRESS ON RECEIPT OF FIVE DOLLARS.

JAMES ALLEN

2458½ Folsom Street, LOS ANGELES, CAL.

WANTED—To correspond with COPPER ROLLING MILLS who can furnish COPPER PLATES for Half-Tone Etchers. Also POLISHING FIRM who can finish the above plates. Address, COPPER, care THE METAL INDUSTRY.

J. P. FANNING, Machinist, 678 Jefferson Avenue, Brooklyn, N. Y.—Maker of Moulds for Casting Solder, Babbitt Metal, Bar Lead, etc. We also manufacture small work. Write for particulars.

WANTED—To purchase or work on royalty articles relating to modern foundry equipment, which will guarantee economy and a saving of labor over present methods. Forward blue prints or patterns. Address, BLUE PRINTS, care THE METAL INDUSTRY.

WANTED—Concerns handling Platers' and Publishers' Supplies to represent a large manufacturing concern of ALKALIS. Address with full particulars, territories covered and number of men selling goods. Address ALKALI, F-7, care THE METAL INDUSTRY.

FOR SALE—The license, good will, patterns and tools of a new and patented value. A good opportunity for anyone wishing to enter the field or add to their present business. Address N. P., care of THE METAL INDUSTRY.

WANTED—A PRACTICAL PLATER to take hold of a plating plant that is doing a good business. Plenty of Brass Work to be had. Address PLATING PLANT, care THE METAL INDUSTRY.

WANTED—Reliable parties to canvass for subscriptions to THE METAL INDUSTRY. Liberal commission. For further particulars address THE METAL INDUSTRY, 61 Beekman street, New York.

GOOD SALES, GOOD EQUIPMENT, GOOD ASSISTANTS and GOOD POSITIONS may be obtained by the insertion of a METAL INDUSTRY WANT.

INQUIRIES

Inquiries received by THE METAL INDUSTRY for Metals, Machinery and Supplies. Further particulars may be obtained by addressing the inquiry number, care THE METAL INDUSTRY.

Inquiry No. 20.—We contemplate building an up-to-date brass foundry on our present site and would like to correspond with firms who are in a position to draw up a set of plans for such a plant.

Inquiry No. 21.—We are contemplating starting a brass and aluminum foundry and would like to correspond with firms furnishing this equipment and supplies.

Inquiry No. 22.—We would like to hear from firms who make a machine for casting small pewter novelties.

Inquiry No. 23.—We would like to hear from firms selling Phosphor Tin.

Inquiry No. 24.—We are in the market for an apparatus to tin small articles, such as nails, etc.

Inquiry No. 25.—We would like to correspond with zinc rolling mills.

Inquiry No. 26.—We are in the market for a galvanizing plant for coating a fence post.

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Advertisements will be inserted under this head at 40 cents per line, 3 lines one dollar, for each insertion, excepting Situations Wanted, 20 cents per line, 3 lines half a dollar. Answers sent in our care will be forwarded.

SITUATIONS OPEN

WANTED—A FOREMAN for Metal Novelty Manufactury. One who has had several years' experience, supervising the manufacturing of plated and decorated novelties, such as pin trays, toilet articles, photo-frames, hatpins, writing desk sets and similar articles. Write fully, stating previous connections and nature of their products; number of employees overseen; age, married or single; salary desired; references. Big chance for future for the right man. Address, METAL NOVELTIES, care THE METAL INDUSTRY.

WANTED—WORKING FOREMAN for PLATING ROOM. Must be familiar with coloring gold, silver, brass, nickel, oxidizing, etc. Steady work guaranteed to right man. A splendid opportunity. Address, WORKING FOREMAN, care THE METAL INDUSTRY.

WANTED—A PLATER of ability wishes partner with a little capital to take interest in plating shop in a city of 400,000. Shop fully equipped for white metal novelty casting and plating. Shop has been running a year. Job work pays running expenses. Will sell outright. Great chance to the right party. For further particulars address, PLATING SHOP, care THE METAL INDUSTRY.

WANTED—A capable ENGINEER to take charge of the mechanical production in a large BRASS and COPPER ROLLING MILL. Must understand the designing of machinery and possess full knowledge of all the latest improvements in rolling mill equipments. Must also understand the hiring and handling of help. Give full information as to practical experience. Reply A. & D., care THE METAL INDUSTRY.

WANTED—A Working Foreman for Plating Room. We manufacture builders' hardware and the man to fill the position for us would require to be thoroughly competent to take full charge, and produce any desired finish. Address J-4, care THE METAL INDUSTRY.

WANTED—To correspond with some high-class salesmen calling on the large FOUNDRY trade throughout different parts of the country who could handle our LUMBER on a commission basis as a side line. For further particulars address LUMBER, care THE METAL INDUSTRY.

SITUATIONS WANTED

Advertisements under this head will be inserted for 20 cents per line, 3 lines for Half a Dollar.

SITUATION WANTED—By a PRACTICAL PLATER desirous of a position. Has had 15 years' experience and can furnish the best of references. Address PRACTICAL, care THE METAL INDUSTRY.

SITUATION WANTED—By a PLATER who is thoroughly familiar with GOLD, SILVER and all finishes. Have had experience in deposit work. Married man, 38 years of age. Address, CYANIDE, care THE METAL INDUSTRY.

SITUATION WANTED.—Competent chaser and Repousée Worker. Also understands etching and general work. Not afraid to work. Address T. T. S., care METAL INDUSTRY.

SITUATION WANTED—By a BRASS FOUNDRY FOREMAN. Thoroughly familiar with all mixtures, and can furnish the best of references. Address BOX A-10, care THE METAL INDUSTRY.

SITUATION WANTED—By FOREMAN ELECTRO-PLATER, with wide experience in plating Gold, Silver, Nickel, Brass, Bronze and Copper on all metals, including Barrel Plating. Can instal plants. Address R. F. C., care THE METAL INDUSTRY.

SITUATION WANTED—By FIRST CLASS PLATER AND POLISHER. Has had 16 years' experience and had charge of men for the last 10 years. Can handle any kind of a plant, understands all finishes and can give good reference. Address F-6, care THE METAL INDUSTRY.

SITUATION WANTED—By PLATER thoroughly conversant with Bronze, Brass, Copper and Nickel Plating, their oxidizes and finishes. Can furnish best of references. Address BOX NO. 6, care THE METAL INDUSTRY.

SITUATION WANTED—By PLATER with 28 years' experience in all metals, including platinum. Should be glad to hear from firms desiring the services of a first class plater. Address BOX NO. 8, care THE METAL INDUSTRY.

SITUATION WANTED—By a Foreman Plater who is capable of taking charge. Thoroughly familiar with all finishes and can furnish the best of references. Address J-6, care THE METAL INDUSTRY.

SITUATION WANTED.—Position as DESIGNER with ELECTRIC FIXTURE MANUFACTURERS. Had also had practical experience in erecting fixtures. I. C. S., Student. Address J-14 care of THE METAL INDUSTRY.

SITUATION WANTED.—By a plater on Gold, Silver, Black Nickel, Brass, Bronze and Tin. Plating Verde Green, Oxidizing. Address T. J. care THE METAL INDUSTRY.

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SITUATION WANTED—By a Plater, Polisher and Buffer. First-class all around man. Expert in all solutions and finishes, silver deposit, galvana plastic, cold galvanizing. Eighteen years' experience in Electro Metallurgy. Address J-10, care THE METAL INDUSTRY.

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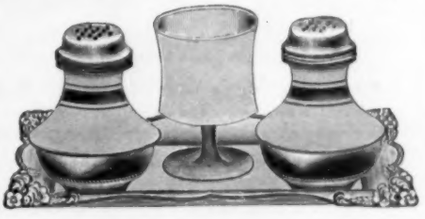

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Waterbury (Conn.) Farrel Foundry & Machine Co.

SAND BLASTS.
Leiman Bros., New York.
Paxson, J. W., & Co., Philadelphia, Pa.

TUMBLING BARRELS.
Baird Machine Co., Oakville, Conn.
Globe Machine & Stamping Co., Cleveland, O.
Chas. F. L. L'Hommedieu & Sons Co., Chicago, Ill.

VOLTMETERS AND AMMETERS.
Dow Chemical Mfg. Co., Mansfield, O.
Hanson & Van Winkle Co., Newark, N. J., and Chicago, Ill.
Zucker & Levett & Loeb Co., New York.

ALPHABETICAL INDEX OF ADVERTISERS

*Advertisements inserted every other month. See last or next issue.

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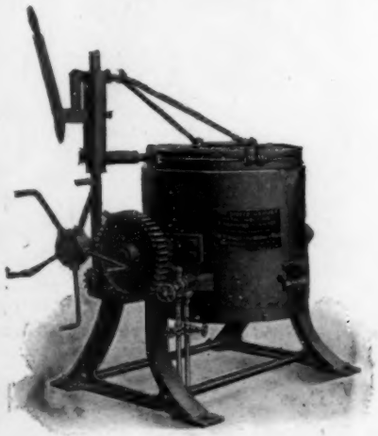
THE tide of **FOUNDRY REHABILITATION** is now rising. It has been "ebb flow" since October; CONFIDENCE is restored and money conditions now permit YOU to MODERNIZE. Metal is low, margin of profit is close, consequently labor and foundry economy must be investigated. We need no introduction. **"OBSERVE"**—We propose to aid you by installing our various lines of **CRUCIBLE, OIL OR NATURAL GAS FURNACES.** Especially for the HOT SUMMER MONTHS, the Coke or Coal Furnaces are unbearable and AWFULLY EXPENSIVE and WASTEFUL, as can be proven by your bills. TO PROVE OUR CLAIM we will forward on "TRIAL and APPROVAL" our

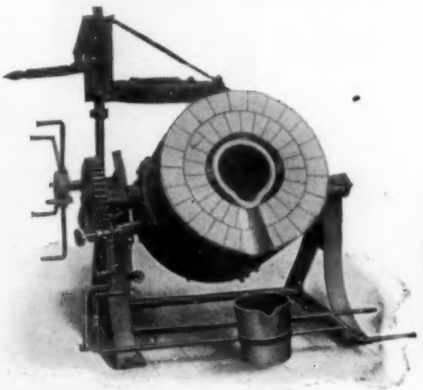
"STEELE-HARVEY"

Crucible Tilting Melting Furnace

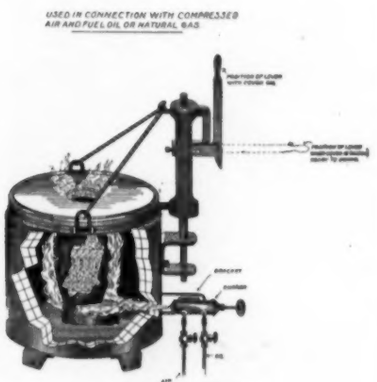
(PATENTED IN ALL COUNTRIES)



Melting Position.



Pouring Position.



Non-Tilting Furnace.

Manufacturers of Plumbers' Goods especially desired. We will put in "YELLOW BRASS" and take out the SAME YELLOW METAL. Scrap metal reduced to composition increases its value by reducing Oxidization and cost of melting 50%; life of Crucibles DOUBLED.

We build Furnaces—special patterns for Lock and Escutcheon works, Chandelier and Electrolier manufacturers, Brass Rolling Mills and German Silver.

We are now offering to contract for all Furnaces, Ladle Heaters, Burners and Blowers necessary. Immediate shipment, and our men to supervise and operate all equipment—Money settlements mutually agreeable. Crucibles from No. 10 to 600. Furnaces with Retained or Removable Crucible. Guaranteed Results. Our "1908" Catalogue now ready.

THE MONARCH ENGINEERING AND MANUFACTURING CO.

BALTIMORE, MD., U. S. A. **Works, Curtis Bay, Md.**

REPRESENTATIVES

CARR & SPEER, 120 Liberty St., New York.

A. L. TAYLOR CO., 9 California St., San Francisco.

J. W. JACKMAN & CO., Caxton House, London, England.

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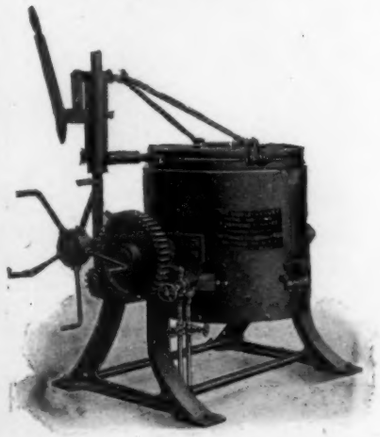
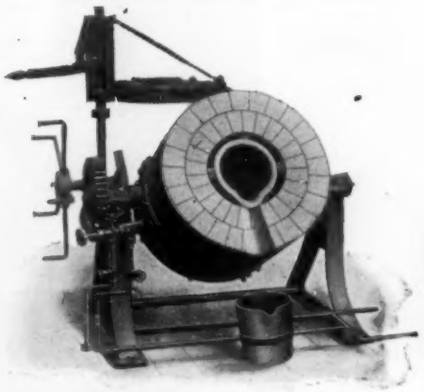
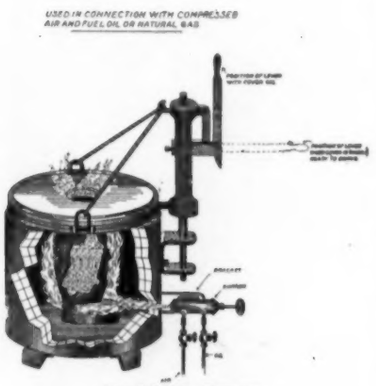


Melting Position.



Pouring Position.



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Brass Foundry Supplies

FORCED and NATURAL DRAFT FURNACES and MAGNETIC SEPARATORS, etc., etc.

Furnaces for every purpose

Catalogues ? Sure !

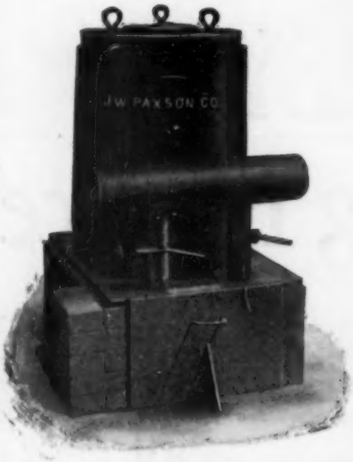


Fig. 621
Forced Draft Furnace

Fig. 622
Natural Draft Furnace
"SQUARE"

Fig. 623
Natural Draft Furnace
"ROUND"
Also made with drop-grate, and with closed bottom to be used with forced draft

Fig. 209
Sprue Cutters. All Sizes

OUR
New Bulletin No. 18
TELLS ALL ABOUT
Molding Sand
Core Sand
Fluxing and
Partings
For Brass Foundries

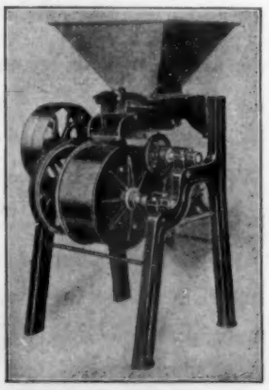


Fig. 76
The Paxson-Sawyer Magnetic Separator

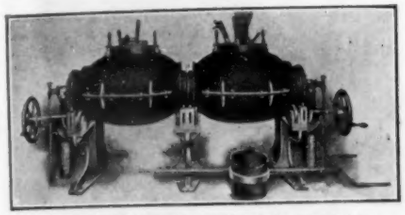
J. W. PAXSON CO., PHILADELPHIA

MELTING FURNACES

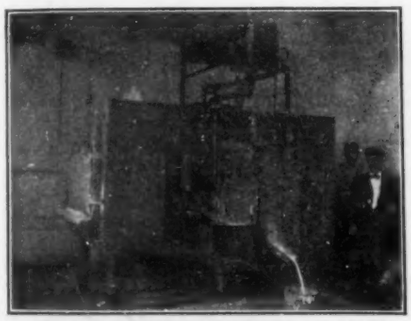
MANUFACTURED BY

ROCKWELL FURNACE COMPANY

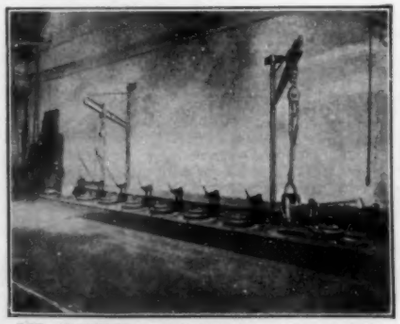
26 Cortlandt Street, New York, N. Y.



DOUBLE CHAMBER MELTING FURNACE.



SCRAP MELTING FURNACE, U. S. NAVY YARD, WASHINGTON.



PIT CRUCIBLE FURNACES, U. S. NAVY YARD, BROOKLYN.

TILTING CRUCIBLE FURNACE. POURING.

SIMPLEX MELTING FURNACE.

A FEW TYPES OF

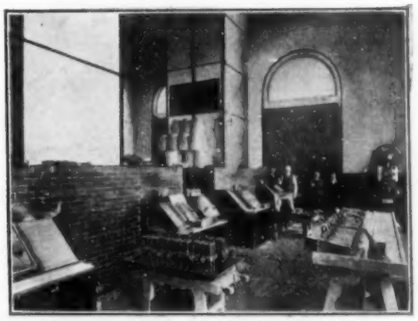
Rockwell Metal Melting Furnaces

ASSAYING
BABBITT OR WHITE METAL
COAL & COKE
CRUCIBLE, ABOVE FLOOR TYPE
CRUCIBLE, COMBINATION COAL AND OIL
CRUCIBLE, MINT TYPE
CRUCIBLE, PIT TYPE
CRUCIBLE, TILTING TYPE
CUPELLING
CYANIDE HARDENING
DOUBLE CHAMBER FURNACES
GALVANIZING
GOLD BOILING
GAS
LADLE HEATING
MINTING
MUFFLE
OIL
REVERBERATORY
SCRAP REDUCING
SINGLE CHAMBER
SIMPLEX
SWEEP REDUCING
SOFT METAL
TINNING
TILTING CRUCIBLE
TWO CHAMBER TYPE
VALVE OUTLET POTS

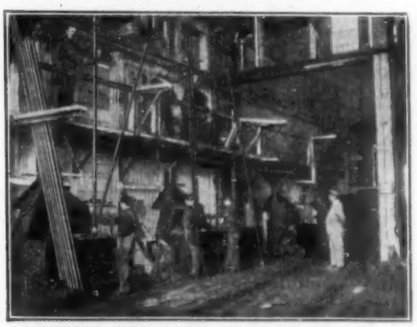
LIFT OUT TYPE CRUCIBLE FURNACE.

SEND FOR NEW 32 PAGE CATALOG "W"

ROCKWELL FURNACE COMPANY



MINT TYPE MELTING FURNACES, U. S. MINT, DENVER, COLO.



TINNING FURNACES AT YORK MFG. CO., YORK, PA.

GALVANIZING AT YORK MFG. CO., YORK, PA.

ASSAYING FURNACES. ROYAL MINT, OTTAWA, CANADA.

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